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The influence of sociocultural factors on the uptake of innovative rural mobility solutions

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The influence of sociocultural factors on the uptake of innovative rural mobility solutions

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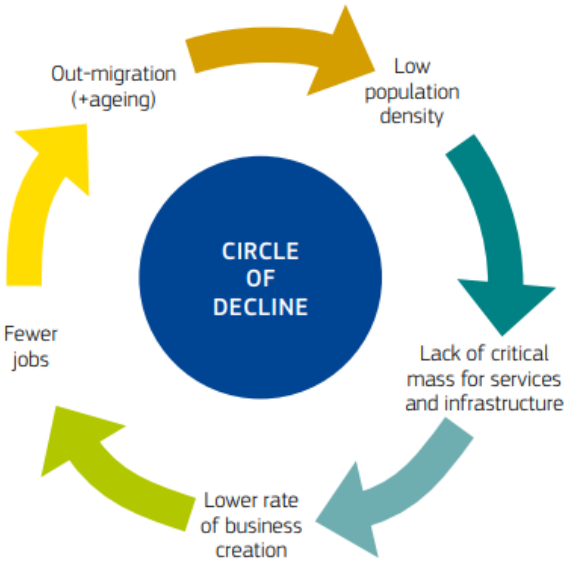
Introduction

Accessibility to services is crucial for the wellbeing of rural residents and the social and economic resilience of rural communities (ENRD, 2017). Ensuring this accessibility can be challenging as the long distances and low population densities that characterise most rural areas are not conducive to the provision of services or infrastructure. Large distances between communities and households present logistical challenges while the lack of critical mass means that investments are often large relative to the number of people served. The resulting lack of accessibility can have a negative impact on economic activity and quality of life. This, in turn, may lead to the outmigration of the working-age population, intensifying the effect of population ageing and ultimately resulting in economic and social stagnation. Improving mobility and accessibility to services in rural areas is central to breaking this 'circle of decline' (OECD, 2010) (see Figure 1).

Figure 1. Circle of declining rural areas. Source: OECD 2010.



In the literature, access to transport is emphasised as a vital factor in increasing the competitiveness, sustainability and attractiveness of rural and remote areas by providing access to employment, education, healthcare and leisure activities (Codatu, 2016). **In contrast to urban areas, where transport initiatives generally focus on environmental concerns, rural transport initiatives tend to have accessibility as the primary focus (OECD, 2009). As such, a key challenge for rural areas is finding cost-effective ways to increase accessibility and mobility for all residents regardless their socio-economic and health status.**

Accessibility challenges in rural areas are by no means a new phenomenon. These challenges have been exacerbated in recent years, however, by cuts to public budgets, centralisation of public services and demographic change. Demographic trends such as population ageing have increased the demand for certain services, while at the same time, cuts to public service budgets have made them more difficult to provide. Thus, it is not only a question of meeting the increasing demand for existing services, there is also a need for innovative approaches that address accessibility challenges in new ways (Copus et al., 2016).

The emerging solutions for rural mobility are a combination of both social, digital and institutional innovations and are generally focused on novel and flexible forms of mobility and a shifting paradigm from car ownership to vehicle usage (e.g. car and ride sharing). Innovations are also emerging in the

form of "service-to-people" initiatives. Local people and non-profit organisations are at the forefront of these innovative approaches, often acting as providers of solutions in the absence of state or market al.ternatives (ENRD, 2017). This study focuses on the influence of sociocultural factors on the uptake of such innovative rural mobility solutions.

Aim and scope

This study is an output of the MAMBA project (Maximising mobility and accessibility of services in rural areas of the Baltic Sea Region), funded by the Interreg BSR Programme 2014-2020. MAMBA project included a consortium of fifteen partners from six countries, and resulted in the implementation of a range of innovative rural mobility solutions in remote regions, towns and villages throughout the Baltic Sea Region. The study was originally published in July 2018 as a "pre-study", with the aim of supporting the MAMBA project partners to develop and implement innovative rural mobility solutions in rural locations around the Baltic Sea Region. At this time, the study was designed to highlight the sociocultural factors that may influence the success of the mobility pilots planned by the project partners. It addressed the key aspects for consideration in the context of the different solutions they were planning to implement. This revision includes much of the original material along with examples throughout that highlight the ways in which sociocultural factors acted as enablers and/or barriers in the implementation of the rural mobility solutions piloted through the MAMBA project. Where relevant, the revision also incorporates newly published material from other projects and research.

The report is divided into two parts. **PART 1: Introduction to sociocultural factors** explores rural mobility challenges from different sociocultural perspectives including sections on individual-related factors, context-specific factors and governance-related factors. **PART 2: A sociocultural perspective on mobility solutions** addresses sociocultural factors as they relate to six different innovative mobility solutions: demand responsive transport (DRT); car sharing; ride sharing; mobility as a service (MaaS); combined transport solutions; and service to people. Each section provides a detailed description of the mobility solution, outlines the relevant sociocultural considerations, highlights what works and why and gives a summary of the common barriers to success in implementation. Each section also highlights the relevant experiences from the MAMBA partners who worked with the respective solution. The report concludes by synthesising the first two parts to provide a "road-map" for navigating sociocultural factors in the context of the different innovative mobility solutions.

The study is primarily based on desk research, including both academic literature and other relevant sources, such as project reports. Further input was provided through qualitative interviews with selected authorities and representatives of innovative rural mobility initiatives both within MAMBA project and beyond.

PART 1: Introduction to sociocultural factors

Mobility is produced within a prevailing economic, political, social and cultural context (Walks 2016). As such, this project takes a broad approach to sociocultural factors, incorporating individual-related, context-specific and governance-related factors. **Individual-related factors** can be understood as factors specific to the individual people, for example, age, gender, attitude, lifestyle, socio-economic status. A transport authority or municipality is likely to have limited control over individual-related factors however it is still useful to understand how these factors influence travel behaviour when planning mobility solutions. **Context-specific factors** refers to country and location-specific preconditions, for example, cultural and economic conditions, geographic specificities, perceived and genuine safety concerns and mobile network and internet access. Understanding these factors is vital in designing mobility solutions that will work in a given context. **Governance-related factors** can be understood as the political and administrative environment, including coordination within and between different levels and branches of government, cooperation between government and other types of stakeholders and availability and stability of funding. In other words, the success of rural mobility solutions also depends on how the transport and mobility issues are steered and organised at the local, regional and national level. The instruments that are available for the public authorities to promote rural mobility solutions (e.g. public procurement, car fleet sharing, funding support) are briefly described. Part 1 addresses each of these three elements in turn, providing a basic introduction to sociocultural factors designed to complement the discussion of specific mobility solutions in Part 2.

Individual-related factors

Individual-related factors can be understood as factors specific to individual people. While these factors are likely to be largely beyond the control of a transport authority or municipality, it is still useful to understand how they influence travel behaviour when planning mobility solutions. This section covers a range of individual-related factors with the potential to effect mobility behaviour including sections on socioeconomic status, gender and household composition, young people, people aged 65 and older and attitude and lifestyle factors. It first presents a short description of the key considerations relevant to each group, both in a general sense and, where possible, with a specific rural focus. Following this, it provides a summary of the target groups, the key challenges when it comes to providing mobility solutions to each group and the factors that may motivate the different groups to change their travel behaviour.

Socio-economic status

Socio-economic status affects mobility, with dual car ownership more common in high socio-economic status households and public transport use and walking more common in low socio-economic status households (Haustein & Nielsen, 2016). For poorer households, lack of access to a car may result in real accessibility problems in reaching work, health services and cheap shopping (Jeekel, 2014). The relationship also goes the other way, with higher levels of physical mobility

associated with increased possibilities for social mobility through, for example, access to a wider range of available employment opportunities (Rai & Vega, 2012) or the ability to invest in social networks on a greater scale (Jeekel, 2014).

It is important to acknowledge that the relationship between mobility and socio-economic status, though widely accepted, is complex and fluid (Rai & Vega, 2012). High socio-economic status does not always correspond to high levels of accessibility nor does low-socio economic status necessarily mean limited mobility. Individuals with high socio-economic status have been found to have a tendency to choose housing in low-density residential areas far from employment centres and with little access to public transport (Preston & Raje, 2007; Rai & Vega, 2012). Similarly, in many rural areas, car ownership is common even among low socio-economic groups (Rai & Vega, 2012). What is important to recognise is that, even in societies where both high and low-income groups have access to a car and the associated mobility, low-income groups will be more vulnerable to economic shocks such as oil price increases or car repair bills. These groups may also have less access to the social capital that determine an individual's ability to call on others for help, including a lift in someone else's vehicle, or borrowing a vehicle when necessary (Walks, 2016).

Gender and household composition

Women and men are likely to have different attitudes towards different modes of transport, as well different mobility needs and travel patterns. Generally speaking, men are more likely to favour the private car and women are more likely to walk or take public transport – even in rural areas (Limtankool et al., 2006; Miralles-Guasch et al., 2016). Interestingly, one study found that women who associate driving with enjoyment, feelings of status, autonomy and safety reported similar levels of car use to men (Bergstad et al., 2011). This suggests that it is perhaps not gender, but rather attitude to driving that predicts car use (see below section on attitude and lifestyle factors). Age also plays a role, with older women the group least likely to be mobile (Miralles-Guasch et al., 2016).

Household composition has also been found to affect transport behaviour, for example, having children in the home. Based on interviews with 106,091 individuals aged 16-29 years in Catalonia, Spain, about their everyday mobility, Miralles-Guasch et al. (2016) found that, although men are more likely to be mobile than women, women who are mobile take more trips. This is most pronounced in middle-aged adults and is likely due to the combination of employment and parenting responsibilities at this stage in the life course (Miralles-Guasch et al., 2016). In fact, the presence of children has been found to increase the likelihood of car use for both genders (Bergstad et al., 2011; Limtankool et al., 2006).

Young people

Age plays an important role in determining the choice of transport mode and the uptake of innovative mobility solutions. For young people, particularly those under the age of 18, accessibility is shaped not only by the transport options available to them but also by real and perceived safety concerns – both their own and those of parents/guardians (Jones et al., 2000). Evidence suggests that these concerns have grown in recent years, limiting young people's independent mobility and resulting in a

growing trend of 'ferrying children by car' (Jones et al., 2000). Notably, safety concerns have been found to be less pronounced in rural areas (Jones et al., 2000). Here, however, great distances and lack of transport options is more likely to limit young people's independent mobility.

For young people whose parents are not often around or for those whose parents do not have access to a private car, lack of mobility may limit social and recreational opportunities. This in turn affects their ability to develop the social and occupational skills that are an important part of adolescent development. The journey itself may also be seen as valuable by young people if it provides an opportunity to socialise with friends (Jones et al., 2000). Even once they reach the legal driving age, young people are the group that represent perhaps the most scope for change. Their behaviours are less likely to be fixed, they (generally) have less access to resources to enable regular private car access and they are more likely to be responsive to new types of solutions, including those based on ICT, than older people.

People over 65 years of age

Given Europe's aging population, the mobility of those over 65 years is of growing interest to researchers and policy makers (Haustein and Siren, 2015; Haustein, 2012; Ahern & Hine, 2016). This is a particular challenge in rural areas given the increasingly high shares of older citizens that make-up rural communities (Corpus et al., 2017). Berg and Thoresson's (2017) international literature review on mobility and transport solutions in rural areas highlighted the elderly as a particularly vulnerable group due to the limited access to activities and services they experience once they cease driving. For example, a study by Ahern et al. (2010) on the mobility of the elderly in rural Ireland found that, although the car is a preferred mode of transport for older people, those who do not drive are often reluctant to ask for lifts for "non-urgent" trips (social and non-food shopping). Thus, those who are reliant on lifts from neighbours and family may experience limited opportunities for social interaction with subsequent effects to their wellbeing. The authors conclude that alternatives for the elderly should more closely match what is provided by the car (door-to-door, 24-hour service).

Despite some commonalities, it is important to recognise that older people are an increasingly heterogenous target group with respect to their transport preferences, behaviour and motivations (Haustein, 2012). Based on a systematic review of studies which attempt to categorise older people based on a combination of demographic, health-related and transport-related factors, Haustein and Siren (2015) identified four generic groups. *Affluent mobile drivers* are described as highly mobile, highly car-oriented people with high incomes and good health. This group tend to be younger and are more likely to be male. *Transport service-dependent seniors* are mostly depended on public transport, walking (if their health status allows) or on getting a lift from someone. Older women are more likely to fall into this category than older men as are those from low-socioeconomic backgrounds. *Car-dependant seniors* rely on the car predominantly for health reasons but have low level of resources and thus may not always have access to a car. People in this group tend to have negative attitudes or lack of ability to use public transport and do not enjoy walking. They appear to be overrepresented in rural

areas, though geographical factors were not considered in all studies. *Mobile multi-modal seniors* are active but without being car dependent (Haustein & Siren, 2015).

The dependence of older women on public transport or getting a lift from someone can be explained, at least part, by the fact that women over 65 years are currently less likely to hold a driver's licence than men of the same age (Haustein & Siren, 2015; Haustein, 2012). It may also be an indirect result of lower levels of financial independence (Haustein, 2012). As such, it is possible that these gender differences will reduce with subsequent generations, resulting in higher instances of private car use among older people in the future. With respect to accessing information about transport, it is worth noting that ICT use has been found to be highest among the affluent mobile group (91% have mobile phone and 74% internet access) and lowest among those reliant on transport service (58% / 24%) (Haustein, 2012). In other words, those who are most comfortable using technology are also those who are most likely to be mobile. When it comes to the barriers to using transport services by the elderly, inappropriate marketing and advertising of services that is not sufficiently adapted to the needs of this target group was identified as an important barrier, in addition to health and other age-related issues (Berg & Thoresson, 2017).

Attitude and lifestyle factors

At the individual level, attitude is important when choosing a mode of travel. For example, people's attitude to cycling, depends on their lifestyle, their personal circumstances, whether they have access to a car, and the social norm. One study found that differences in cycling frequency can be explained by variables that go beyond the provision of cycling infrastructure and include norms, beliefs and meaning (Haustein & Nielsen, 2016). Environmental concerns can also be a strong motivator, however for most groups will be outranked by convenience (for car users), price (among those who favour PT and walking) and practicality (cyclists) (Haustein & Nielsen, 2016). A busy lifestyle is also a factor, resulting in mobility decisions driven by the desire to reduce stress and combine multiple purposes into a single trip (Jeekel, 2014). In this case, the likelihood of car use is high, even among individuals who would describe themselves as environmentally conscientious (Haustein & Nielsen, 2016). As noted above, the make-up of the household is also a lifestyle factor that will influence modal choice with households with children using the car more than households without children (Bergstad et al., 2011).

When it comes to choosing a car as a mode of transport, research shows that convenience is only part of the story. For many users (particularly men), the car is associated with freedom and feelings of strength, power and skill (Jeekel, 2014). There is an abundant literature on the role of car as a means of transport in rural areas (e.g. Gray et al., 2001). Scholars have distinguished between 'structural' dependence on a car and reliance on the car. In the case of 'structural' car dependence, individuals have obstacles to free choice due to contextual or external factors (e.g. lack public transport or individual attributes such as age of having a disability) (Mattioli et al., 2016). Others simply develop reliance on the car because they can afford it and because they feel that they have a poor access to the public transport.

Habit also plays an important role in travel-mode choices, meaning that an action often takes place without considering other alternatives. Many studies show that the power of habit is particularly strong when it comes to car use (Berg, 2016; Bamberg et al., 2003; Carrus et al., 2008). Road users are often more resistant to changing to a different travel mode, and the resistance is greater if there is a previous habit.

In rural areas, high levels of car use among some groups may have knock-on effects for others (Brake & Nelson, 2007). It reduces the overall demand for public transport, which may result in cuts to services. This has serious consequences for groups without access to other forms of transport, with the elderly, young people, people with disabilities and low-income households most likely to be affected (Brake & Nelson, 2007). Thus, increased car usage contributes to undermining trade, services and public transport in rural areas, which leads to isolation of residents without access to cars. Accessibility to rural services and trade needs to increase in parallel with efforts to increase sustainable mobility, and increased fuel taxes often hit those who already have a hard financial and have no alternative than a car (Berg & Thoresson, 2017).

Summary of individual-related factors

As demonstrated above, the individual-related factors that impact mobility in rural areas are both numerous and complex. While simple categories like 'elderly', 'youth', 'men', 'women' may offer some insight into travel behaviour, it is equally important to acknowledge the diversity that exists within these categories. For example, despite both being retired, a 68-year-old man in good health may have much more in common with a younger man than with a 79-year-old woman in poor health when it comes to transport behaviour. Similarly, two couples with a similar income may behave quite differently depending on whether they have children or not. While a young person with a physical disability may have similar motivations to other young people when it comes to social activities and the need to attend school, their mobility requirements are likely to be different.

With this in mind, Table 1 shows a number of potential target groups, attempting, where possible, to take into account the interaction of the characteristics described above. The table then lists the key challenges associated with developing mobility solutions targeted to this group followed by considerations that may be useful in motivating this group to change their travel behaviour. These target groups will be revisited in the conclusion, in the context of the mobility solutions presented in the next section (Part 2).

Table 1. Impact of individual factors on transport behaviour for different sub-groups

Example target group	**Key challenges**	**Potentially motivated by**
High-income, one or two-car household	Accustomed to high level of flexibility; less likely to be motivated by financial savings	Environmental concerns; desire/need for efficiency; Increased access to social and/or economic activities; increased flexibility/autonomy

Low & middle-income, one or two-car household	Accustomed to high level of flexibility	Financial savings; Increased access to social and/or economic activities
Low-income & middle-income, no-car household	Lack of resources	Access to social and/or economic activities
Single men (young)	High car dependence	Environmental concerns; access to social opportunities
Single men (older)	High car dependence; strong habits formed	Financial savings
Single women (young)	Safety concerns	Environmental concerns; access to social opportunities
Single women (older)	Lack of independent mobility (if no licence/car); high car dependence and strong habits formed (if licence/car).	Access to social opportunities; financial savings; increased independence
Couples with children	Time poor; need for high level of flexibility	Environmental concerns; financial savings
Single parents	Time poor; need for high level of flexibility	Financial savings; access to social opportunities or support (e.g. though meeting with other parents)
Young people (under 18 years)	Safety concerns; may lack any mobility options at all	Desire for independence; access to social opportunities; access to economic opportunities (e.g. part-time job)
Young people (18-24 years)	May have the option of a private car	Access to work or study; access to social opportunities
Young people with disabilities	Exacerbated safety concerns; may lack any mobility options at all	Desire for independence; access to social opportunities; access to medical appointment
Over 65 with good health and high income	Likely to have access to a private car - particularly if male	Convenience; independence
Over 65 with good health and low income	Lacks resources	Financial savings; access to social opportunities
Over 65 with poor health and high income	May require a high level of support; fear of travel	Access to health service; access to social opportunities
Over 65 with poor health and low income	May require a high level of support; fear of travel; lacks resources	Financial savings; access to health service; access to social opportunities

Context-specific factors

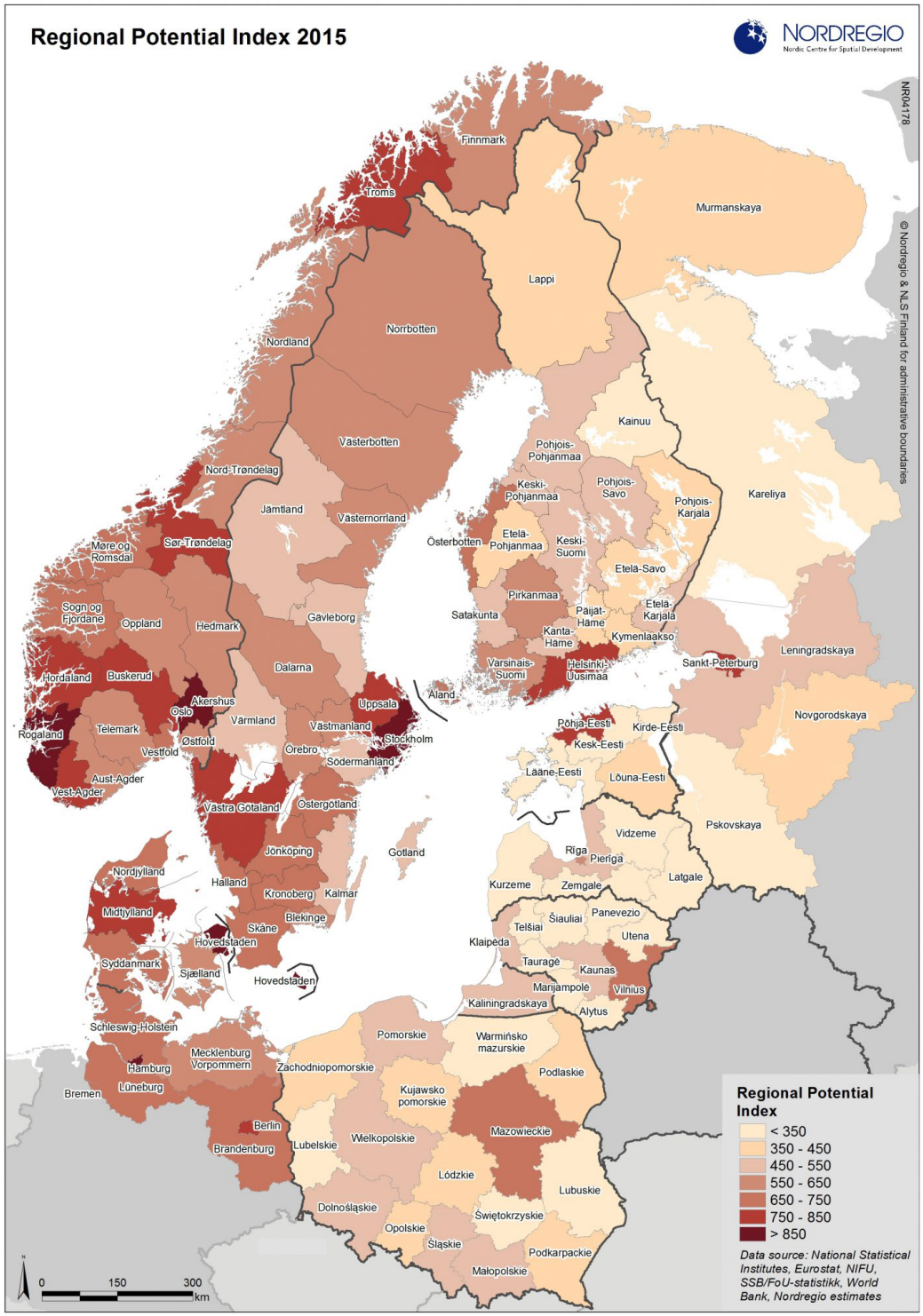
Rural areas are highly diverse. Even across a region, rural communities can incorporate vastly different geographic, demographic and economic characteristics. Context-specific factors refer to country and location-specific preconditions, for example, cultural and economic conditions, geographic specificities, perceived and genuine safety concerns and mobile network and internet access. Understanding these factors is vital to designing mobility solutions that will work in a given context. Context specific factors are particularly relevant when planning to transfer a mobility solution from another country, or even region, as solutions that work well in one place may be poorly suited or need modification to be effective in a different context.

Cultural and economic conditions

Even within the relatively small geographic area of the Baltic Sea Region (BSR), there are considerable economic and social differences. These differences are evident within countries, but also between regions. With respect to national differences, Haustein and Nielsen's 2016 research into mobility styles is a useful starting point. Based on Eurobarometer data, Haustein and Nielsen (2016) developed eight mobility styles and used these as a basis for dividing the EU28 into six clusters. The countries in the MAMBA consortium fall into just three of these. In Finland, Denmark and (west) Germany (along with Belgium and the Netherlands), the study found an overrepresentation of both green cyclists (motivated by environmental concerns) and practical cyclists (motivated by convenience) as well as an overrepresentation of green public transport users, green pedestrians and busy green drivers (Haustein & Nielsen, 2016). In Poland and Latvia (along with Lithuania, Estonia, Spain, Slovakia, Czech Republic, Bulgaria, Romania, Portugal, Greece and Croatia) the study found an overrepresentation of price-oriented PT users and price-oriented pedestrians. Finally, in Sweden and (east) Germany (along with Austria), environmental factors dominated with and overrepresentation of green cyclists, green public transport users, green pedestrians and busy green drivers. Although this study did not take into account geographical features, it is likely that these tendencies will be evident, at least to some extent in rural areas of these countries.

Contextual differences are also evident at the regional level. This is highlighted in Map 1 which shows the results of the 2015 Baltic Sea Region – Regional Potential Index (BSR-RPI). The BSR-RPI is a quantitative measure which aims to highlight the potential for positive economic and social development in different regions (Rispling et al., 2016). It is made up of nine indicators including demographic potential (population density, net migration rate, demography dependency rate and female ratio), labour market potential (employment rate, share of the age group 25-64 with higher education degree, youth unemployment rate) and economic potential (GRP/capita and total R&D[1] investments).

[1] Research and Development

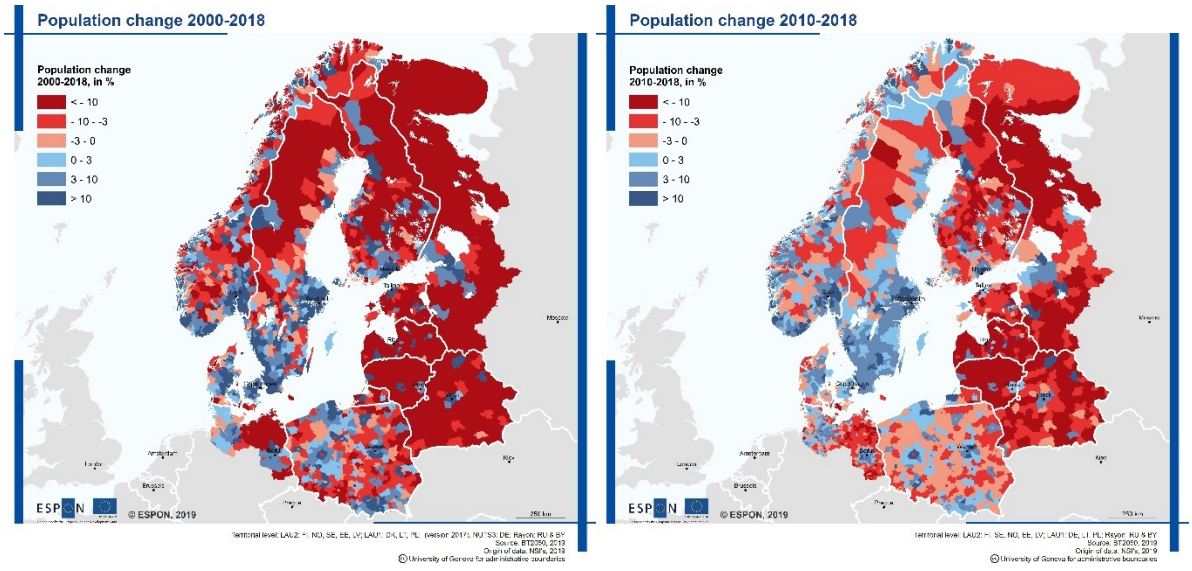


Map 1: Baltic Sea Region - Regional Potential Index 2015. Source: Nordregio, 2016a

As Map 1 demonstrates, potential for positive economic and social development varied substantially across the Baltic Sea Region in 2015. A clear East-West divide is evident, with regions in Norway, Sweden, Denmark and Germany generally scoring higher on the index than regions in Finland, the Baltic States and Poland. Map 1 also suggests an urban-rural divide, with stronger potential evident in the capital regions and other regions that contain large urban areas.

Population development has also varied substantially between countries and regions within the BSR in recent years. This is highlighted in Map 2, which shows the average population change from 2000-2018 and from 2010-2018. As these maps show, the populations of the BSR countries and regions have been changing in different ways since 2000. Municipalities in the south of Sweden, coastal Norway and many parts of Denmark have seen their population's increase. Meanwhile, populations have declined in most municipalities in the Baltic States, northern Sweden and central and northern Finland.

In Germany, municipalities to the north east have experienced population decline while those in the north-west of the country have seen their populations grow. In Poland, population development has been uneven across the country with population increase mostly concentrated around the major cities and population decline evident in many rural municipalities. Regardless of the direction (increase/decrease), population development trends appear to be more pronounced over the longer timeframe.



Map 2. Population change 2000-2018 and 2010-2018. Source: Aguiar Borges et al., 2019

It is interesting to note the slowing, or even reversal, of rural population decline in the countries that received a lot of migrants in 2015-2016 (e.g. Sweden, Germany) (Aguiar Borges et al., 2019). The presence of many migrants within the population is an important consideration for several reasons.

Language abilities may influence the ability or confidence of individuals to access information about mobility solutions (Walks, 2016). Feelings of discrimination based on ethnicity or race may also discourage travel on public transport or the use of public forums to arrange travel (Walks, 2016). New migrants may also be more reliant on public transport in the initial stages. At the other end of the spectrum, regions experiencing out migration might have trouble maintaining transport services due to reduced demand or shrinking public service budgets.

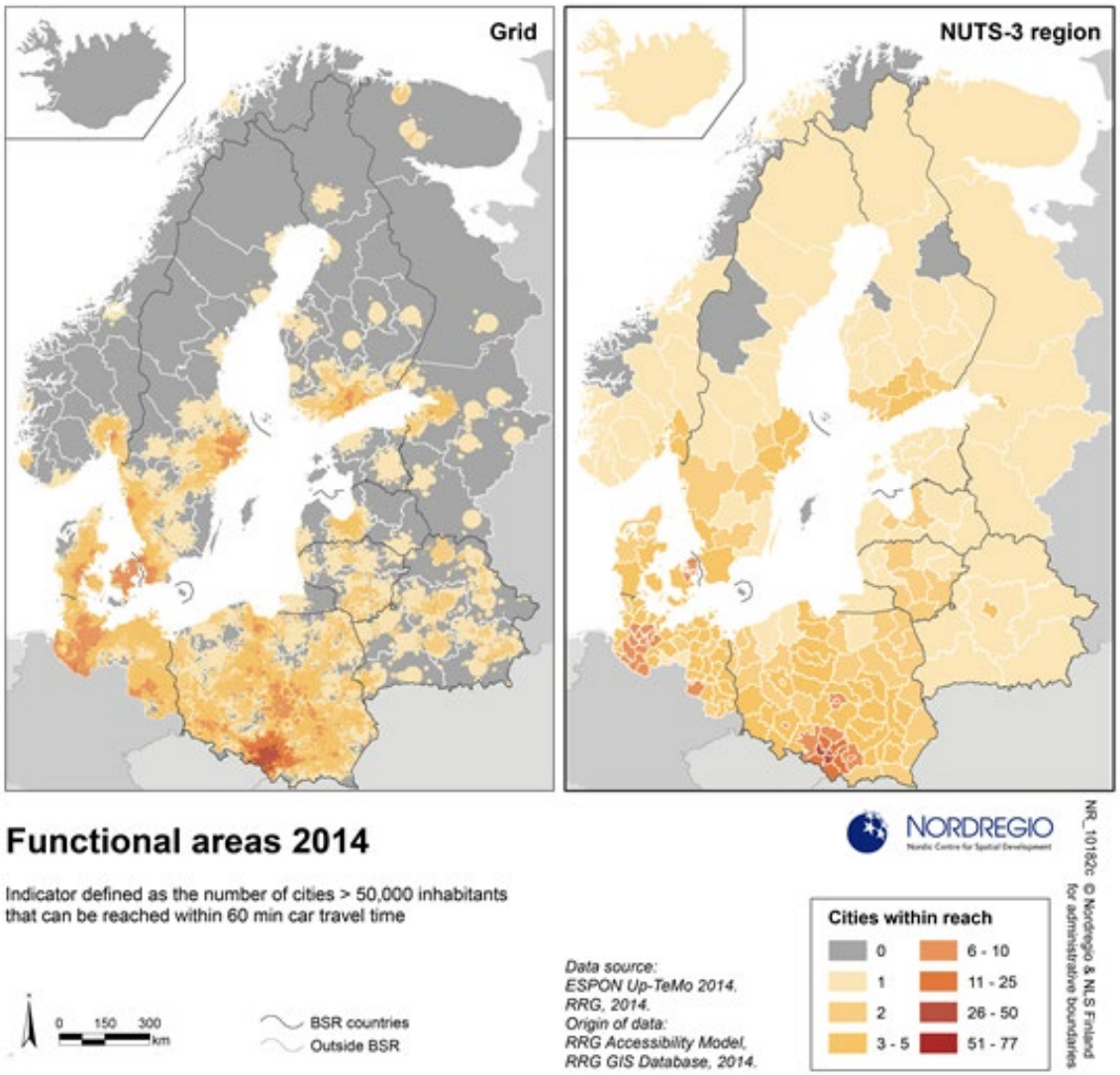
Geographic specificities

The spatial characteristics of territories, for example, remoteness, climate, presence of water bodies, mountains, may have an influence on travel habits. Limtanakool (2006) found that, even once sociocultural factors were taken into account, the spatial configuration of land use and transport infrastructure had a significant impact on modal choice. For example, the success of a ride sharing initiative in Tolg village in Sweden was attributed to the presence of one main regional 'pooling' centre where people tended to commute, as opposed to the villages that have several larger towns in their surroundings.[2]

Of course, geographic specificities interact with planning and infrastructure decisions to shape mobility outcomes. Providing public transport in remote and poorly accessible areas is costly and difficult. The lack of transport in these areas in turn plays a role in determining the ease associated with using particular modes. For example, in remote and poorly accessible areas of Northern Ireland and Scotland public transportation is poorly developed or even non-existent and, as a result, the car is the most dominant mode of transport (Ahern et al., 2010).

Map 3 provides a general accessibility context for the overall BSR, highlighting the number of cities that can be reached within one hour by car at the NUTS3 regional level and the grid level. As these maps demonstrate, accessibility looks quite different in the MAMBA countries. In the BSR context, Germany, Denmark and Poland and the southern parts of Sweden enjoy the highest levels of accessibility and Latvia, northern Sweden and Finland the lowest. Of course, it is important to acknowledge the limitations of an indicator that relies upon car travel as a measure. Despite this, the map does provide some context for the sparsity of different areas within the BSR overall. The geographic specificities of the MAMBA partner regions specifically are addressed in detail in the regional profiles which can be found on the MAMBA website.

[2] Interviews with Pepijn Klaassen (Mobilsamåkning), 22 January 2018, and Hans Arby (UbiGo), 17 May 2018.



Map 3. Functional urban areas in the Baltic Sea Region, 2014. Source: Nordregio, 2016b

Perceived and genuine safety concerns

Alongside the broader geographical context described above, there are also factors in the immediate environment that will impact transport decisions, for example, safety. Feelings of insecurity in using public transport may relate to both the journey itself (e.g. disorderly behaviour on late night buses) or to walking to, from, or between different travel modes. The degree to which safety will affect transport choices varies, with women, young people and the elderly more likely to have their mobility curtailed due to safety concerns (Jones et al., 2000). For women and young people, these fears are more likely to relate to other travellers whereas for elderly travellers, the fear of falling can also be a deterrent (Haustein & Siren, 2015). Safety concerns are also relevant to non-traditional transport solutions that rely on contact between strangers, for example, ride sharing (see Part 2).

Mobile network & internet access

Given the heavy reliance of innovative mobility solutions on online platforms, connectivity is an important context-specific factor. Digital infrastructure is a precondition for developing innovative solutions in the field of mobility, e-health, etc. At the most basic level, it is worth noting that digital progress is by no means uniform across the BSR countries. There is also a considerable urban-rural digital divide with respect to both digital infrastructure and digital skills (ENRD, 2017; Randall, Ormstrup Vestergård & Wøien Meijer, 2020). Figure 2 shows the 2019 results of the Digital Economy and Society Index (DESI). The DESI measures digital progress based on a range of indicators across five themes: 1) connectivity; 2) human capital; 3) use of internet; 4) integration of digital technology; and 5) digital public services (European Commission, 2019). As Figure 2 demonstrates, there are substantial gaps between BSR countries and when it comes to digital development. While the Nordic countries are among the top performers on the index, Poland, Latvia and Lithuania all perform below the EU28 average.

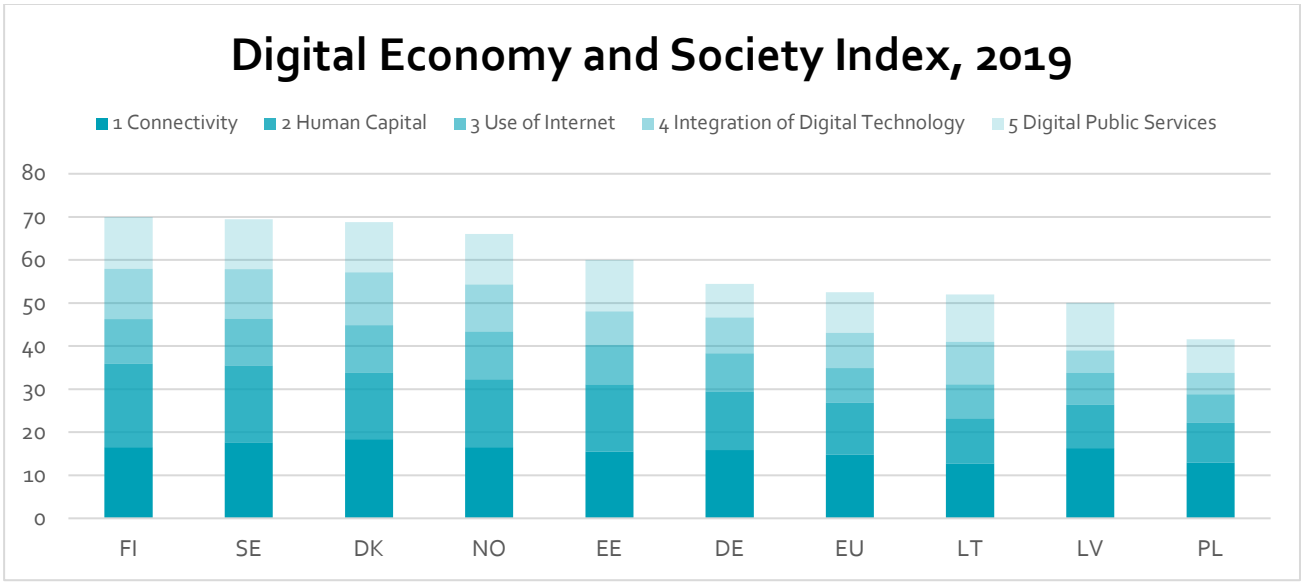


Figure 2. Digital Economy and Society Index, 2019. Data source: European Commission

There are also substantial gaps when it comes to digital infrastructure. Figure 3 shows household coverage of Next Generation Access (NGA)[3] broadband for all households and for rural households in 2018. According to this data, overall coverage is relatively good in the BSR. With the exceptions of Finland, Lithuania and Poland, all countries have coverage above or around the European average. When only rural households are considered a dramatically different picture emerges. Rural households in Norway, Lithuania, Poland, Sweden and Finland all have rural household coverage

[3] NGA includes a range of technologies, all of which are capable of delivering minimum download speeds of 30 Mbps (European Commission, 2015).

levels below the EU average. Rural households in these countries are far less likely than their urban counterparts to have access to high-speed broadband.

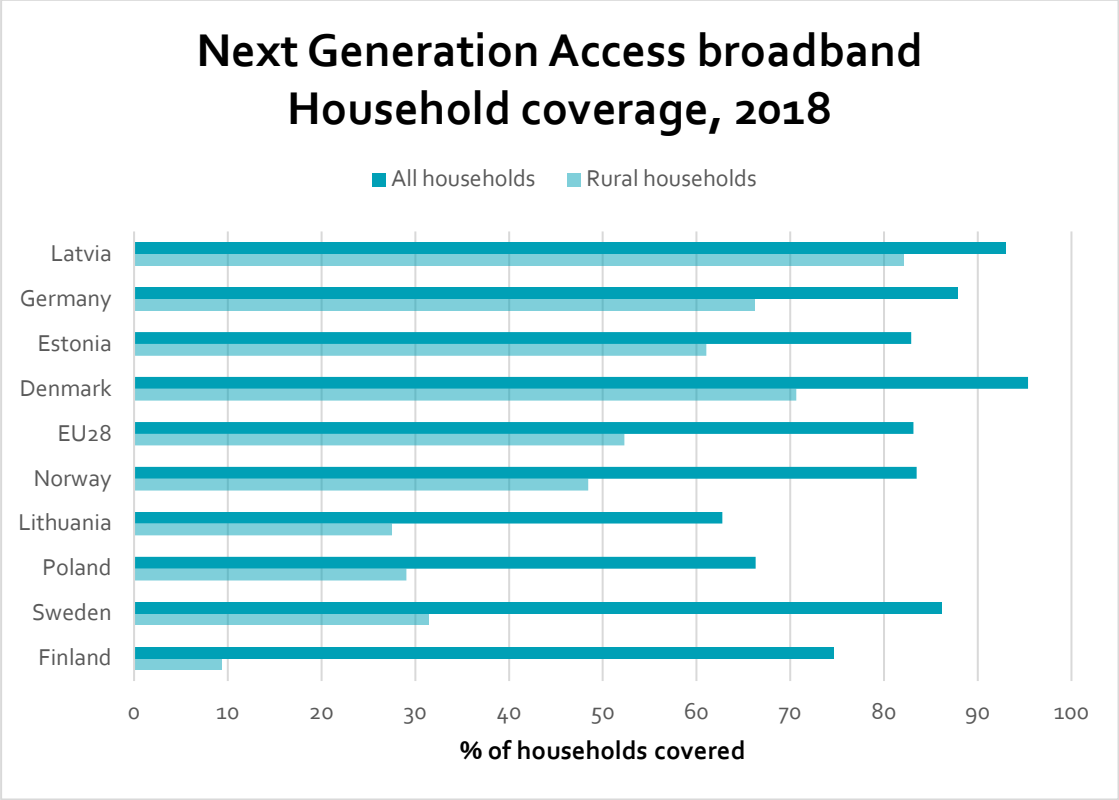


Figure 3. Next Generation Access broadband - Household coverage, 2018. Data source: European Commission.

Finally, even where the infrastructure is in place, it cannot always be assumed that all members of a community will have the financial resources and/or the digital skills to ensure access to online platforms. In many cases, those most comfortable using technology may also be those with the highest levels of independent mobility.

Governance-related factors

Many of the underlying difficulties in meeting transport and mobility challenges can be attributed to governance issues that span infrastructure planning, policy, regulation, financing, procurement and management (OECD, 2016). Governance of mobility and transport goes beyond the individual level and addresses the structural and organisational questions of how mobility is organised in our society.

There are a number of agencies, organisations and volunteer groups involved in the delivery of public transport, school transport, taxis, community and medical transport in rural areas. Furthermore, mobility and accessibility issues traverse multiple sectors (public, private and third sector), levels of government, and policy areas (transport, education, health). In this environment, effective

governance of transport and accessibility requires collaboration between different actors, policy areas and interests (OECD, 2017). This calls for collaborative, bottom-up, partnership-based governance approaches. Otherwise there is a risk that policy agendas will fall short of their desired outcomes or, worse, result in poor outcomes.

Low population densities and resource constraints in rural areas make collaboration, innovation and flexibility in local transport a necessity. A simple example could be rescheduling of medical appointments to the times when public transport is available, rather than funding a new transport service. Moreover, collaboration among stakeholders is essential in facilitating the 'policy bending', if not change in policy and regulations, required in the development of innovative rural mobility solutions (e.g. allowing spare seats in school buses to be used by other community members) (OECD 2017).

Local governments are the key players in facilitating and promoting innovative rural mobility solutions through decision making, shaping public space, setting up parking standards, sharing its own fleet with citizens outside of office hours etc. Moreover, they have the ability to communicate directly with potential users (Share North, 2017).

Renting out municipal fleets

By renting out fleet vehicles outside of office hours, local governments can lower their operating costs and promote car sharing. This can also contribute to better social inclusion in a town, for example, by giving lower income residents access to a car now and then and thus improve the chances for maintaining social contacts or gaining access to different employment locations (Share North 2017).

The involvement of local residents is crucial in rural areas, as strategies and mobility solutions need to take into account local problems and opportunities, based on the local knowledge, needs and conditions. Moreover, the mobility solutions are often bottom-up initiatives organised by the residents themselves. A bottom-up approach was found crucial for success of ride sharing initiatives in Sweden and Germany (e.g. Mobilsamåkning and ELLI). The local governments play an important role in providing an enabling framework and support for such initiatives to thrive.

PART 2: A sociocultural perspective on mobility solutions

This section addresses sociocultural factors as they relate to six different innovative mobility solutions: Demand responsive transport; car sharing; ride sharing; mobility as a service (MaaS); combined transport solutions; and service to people. Each section provides a detailed description of the mobility solution, outlines the relevant sociocultural considerations, highlights what works and why and gives a summary of the common barriers to success in implementation. The content has been developed based on a combination of academic literature, evaluations and reports from other rural transport projects and good practice examples developed by the MAMBA partners. These good practice examples are all based in the MAMBA partner countries and can be accessed on the MAMBA website.

1. Demand responsive transport (DRT)

What is Demand responsive transport (DRT)?

Demand responsive transport (DRT) or transport-on-demand (ToD) is a user-focused approach and refers to public transport services with flexible routing and timetable, adjusted according to demand. Travellers make reservations beforehand to optimise routing and traveller frequency. This mobility service is available to the general public with no restrictions based on the target group (e.g. age or disability). The fares are charged per passenger and not a per vehicle basis (Wang et al. 2015).

Public transport can be made more flexible in a spatial and a temporal sense through demand responsive services. There are different combinations and variations that may help to tailor the mobility offer for the given surroundings. In a spatial sense the following modifications of traditional line-based traffic can be offered (Karl et al., 2017):

- Only certain stops of a pre-determined route are served depending on a passenger's demand (Line DRT)
- A pre-determined route is complemented by additional stops deviating from the original route. These stops are only served on demand (Line DRT with deviations)
- A corridor is defined instead of a route. Within the corridor, stops are only served on demand (Corridor DRT)
- In a pre-determined area, passengers can enter the vehicle wherever they order it, either at certain stops or without restrictions in any desired place (Area DRT, with stops or door-to-door).

In a temporal sense DRT can be offered with or without reference to a pre-determined timetable:

- A timetable contains several possible departure times and the passenger chooses one of them
- The timetable defines the departure time at the first stop and the passenger is informed about the departure time at his stop
- The passenger can freely choose the departure time (Karl et al., 2017)

DRT may be used to provide the entire trip and to complement ordinary public transport services (e.g. last mile travel to /from bus stops). DRT is often offered by voluntary drivers in order to lower the costs for providing the mobility service. Users of DRT generally pay a small fee though services may also be provided at lower or even no cost for low-income earners (Wang et al., 2015). In many cases, the service operates with minibuses (less than 9 passengers) but can also function more like a taxi service using a regular car.

DRT has grown in popularity in Europe since the 90s and is a rather widespread transport solution in rural areas today. Nevertheless, many solutions face challenges of balancing transport demand and supply, while the demand patterns determine service constraints (Jain et al., 2017). More research on DRT services in Europe focusing on, for example, evaluation of DRT, the success and failure factors and how the limitations can be overcome would help to optimize existing and future DRT services (Mageean & Nelson, 2003; Nelson & Phonphitakchai, 2012).

Relevant sociocultural considerations

User characteristics are often discussed in the research and are important to consider when planning a DRT solution (Mageean & Nelson, 2003; Nelson & Phonphitakchai, 2012). Several studies identified people over 65 years of age, people with disabilities, and those with limited financial resources as the main users of DRT services (Wang et al., 2015). In this sense, DRT is a socially-inclusive mobility solution and is a good alternative for people who lack access to cars. Its contribution to community building has also been noted (Nelson & Phonphitakchai, 2012). DRT has been found to be particularly useful for connecting isolated communities with a lack of public transport services to essential services, such as healthcare.

Several European studies have found that females are the dominant users of the DRT services (Mageean & Nelson, 2003; Nelson & Phonphitakchai, 2012) and that the average age of users is usually higher than that of the population as a whole (Wang et al., 2015). At the same time, there are sufficient examples of DRT use among diverse age groups to demonstrate that it is possible to tailor DRT to different user groups (Mageean & Nelson, 2003). A study by Wang et al. (2015) on DRT in rural England found that men travel less frequently than women when they are below pension age. However, there are no significant gender differences once they reach retirement age.

The knowledge of user characteristics and profiles is important for designing DRT solutions that are better adapted to the needs of the specific user groups and also for designing strategies for reaching out to underrepresented user groups.

What works and why?

Context-specific factors such as geographic specificities and service characteristics play a significant role in ensuring the success of DRT solutions. Several studies point out that there is a higher demand for DRT in rural areas with low population density and dispersed settlement patterns, and that the DRT trip frequency would is lower in more densely populated areas (Laws, 2009; Wang et al., 2015).

Moreover, according to Davison et al. (2012), the demand for DRT is higher in areas that are characterised by ageing populations and more varied household structures.

Jittapirom et al. (2019) evaluated preferences of the elderly towards a smart DRT service within two Dutch cities, and found the main challenges to be providing adequate information flows and bridging the physical distance to the pick-up point. With regard to these findings, the authors suggest a simple booking process and, if appropriate, a door-to-door service. Further, they stress the importance of initiating bottom-up approaches to ensure the needs of older citizens are catered for.

Based on the analysis of user characteristics and profiles, Wang et al. (2015) argue that there is an emerging potential to develop the DRT market by including 'new' user groups such as work commuters and retired males. In order to reach out to these new potential customer groups, it is advised that the DRT solutions become more digitally and technologically advanced, incorporating information, purchase, booking and communication functions. Moreover, the research shows that DRT can meet the mobility needs of different user groups if the offer is adapted to the demand (certain times of the day when the residents are likely to use DRT). Knowledge about the mobility needs of the residents is crucial in this connection (Berg & Thoresson, 2017).

Brake and Nelson (2007) stress high level of collaboration and strong relationships among stakeholders as being key to the success of DRT solutions. Similarly, Davison et al. (2012) emphasise the importance of a community-orientated partnership approach. Linking DRT with healthcare services is one area where particular potential for such partnerships is evident. A study by Ahern and Hine (2015) in rural Ireland found that trips to health facilities were the most difficult trips to make, and suggested that 'there is a need to increase a synergy between transport operators and health service providers, and coordination between government bodies responsible for health policy and those implementing transport policy' (p. 1). Several other studies also indicate the potential to increase synergies between DRT and other public transport operators, public services and stakeholders (Ahern et al., 2010; Ahern & Hine, 2015; Davison et al., 2012). This will, of course, require inclusive and collaborative governance approaches.

When it comes to bottom-up approaches to DRT (i.e. services organised by community volunteers), it can help to have at least one highly motivated individual driving the initiative (see good practice example: Amata County Social Service).

There is a lot of focus in the research on the importance of service-related factors (e.g. improving routeing, timetable, booking methods, awareness of the service, easy-to-remember phone number, user-friendly service and the role of vehicle types) for increasing the success of the DRT solutions. Service-related factors were identified as the critical success factors for DRT implementation in rural Scotland (Reichenberger et al., 2018). Providing real-time information on the DRT was also found to be important (Berg & Thoresson, 2017). Avermann and Schlüter (2019) identify waiting times and ease of entry as the main factors predicting customer satisfaction during the trial run of a door-to-door

DRT service in rural Germany. Interestingly, they do not find any evidence that sharing the ride with other customers affects customer satisfaction.

Another factor relevant to DRT provision in rural areas is cost. DRT is often highly subsidised however there may be some opportunity to recoup costs by charging a small fee for use of the service. In a survey conducted during the trial phase of the DRT service "Eco Bus" in a rural area of Germany, Nyga et al. (2020) found that the willingness to pay for DRT services is approximately as high as for standard public transport. Women tend to accept higher prices as do users with a higher dependency on the service and individuals driven by ecological motivations. Surprisingly, the authors found that owning a car did not reduce the willingness to pay for the DRT service.

When it comes to the vehicle types, there is some evidence suggesting that taxis provide more cost-effective DRT services in areas with low population and demand, while minibuses work more effectively on semi-fixed routes in more densely populated areas, though this may not be true to all contexts (Wang et al., 2015).

According to an international literature review on mobility and transport solutions in rural areas by Berg and Thoresson (2017), some authors argue that predefined stops work best if the DRT trip is a part of a multimodal journey, as it is easier to plan the travel than if the stops are flexible. Research also shows that DRT solutions work best in places with no or low competition with other modes of public transport (e.g. see Vippari case study).

Common (sociocultural) barriers to success

DRT users generally have good attitudes and perceptions of the DRT service against a wide range of factors such as comfort, convenience, reliability, safety and ease of making reservations (European Commission, 2007; Nelson and Phonphitakchai, 2012). Failures of the DRT solutions are more often associated with service-related limitations, insufficient marketing and branding but also sociocultural factors are an important variable for the success of DRT services.

It is vital that DRT solutions are based on local knowledge and tailored to local specificities and customer needs (Papanikolaou et al., 2017). Failure to do so is one of the most commonly cited resons why services do not succeed (Davison et al., 2012). According to Davison et al. (2012), lack of market research detailing which passengers are likely to use DRT at certain times increases chances of the service not being appropriate for the community served. Another common barrier is a poor quality of transport information provided to the residents (Berg & Thoresson, 2017). Berg and Thoresson (2017) stress the importance of real-time information, particularly in relation to delays and other traffic disorders.

A study by Ahern and Hine (2015) on DRT in Scotland and Northern Ireland found that older men see DRT services as being too "feminised". At the operational level, the success of DRT schemes may be hampered due to a 'novelty barrier', as it is different from conventional public transport which can act as a deterrent to some passengers. Not incorporating sufficiently high levels of technology when providing a complex service has also been a reason for failure in some cases (Davison et al., 2012).

Experiences from MAMBA

As part of the MAMBA project, **Vizdeme Planning Region (Latvia)** implemented two demand responsive transport (DRT) services within the rural municipalities of Mazsalaca and Aluksne. Both are a unique example of a DRT service within Latvia. The municipalities are shaped by demographic change and ageing of the population and suffer from limited access to services due to a lack of public transport and sparse settlement structures. In some cases, there is no public transportation available at all and, whenever there is, residents must travel long distances to reach the bus stops. These demographic and geographical circumstances present challenges for the operation of DRT service but also suggest the potential for high levels of use if the right implementation approach is taken.

The first step for Vidzeme Planning Region was a survey, conducted in the region in 2014, revealing that residents were open to the idea of setting up a DRT system in the region. This is a prerequisite for the acceptance and utilisation of the service. Other key success factors for the DRT service in Vidzeme Region were provision of accessible information about the service and active collaboration between stakeholders throughout the implementation process. These have also been identified as key success factors in the literature.

The DRT services are available for all residents as well as for visitors. As is often the case with DRT, the main user group is women (85% of users) and the average age of users is 60 years of age.

The **County of Plön** also implemented a DRT service as part of the MAMBA project, however using a different approach to that of Vidzeme Planning Region. Here, the target group was broader, and the aim was to provide additional services to supplement the existing bus line called "ALFA". The idea is to provide better connections mainly during weekends and evenings from small villages to the nearby sub, middle or upper centres. To do so, the service offers rides from villages with rare public transport connections to other bus stops via on demand taxi rides. The trips must be booked at least 60 minutes prior to departure via phone. No real-time information is provided.

The advantage of this DRT supplement is that the users did not have to adapt to a new solution. Rather, they see the new offer as an improvement of the current system. This may lead to users adopting the service more quickly than if it were a completely new solution. This point is particularly relevant to those implementing new mobility solutions through pilot programs as these may have limited time to demonstrate their effectiveness before seeking new funding.

The target group includes a wide range of people including those over 65 years of age, tourists and students. As suggested in the research, the new offer was advertised though many different mediums such as flyers, press and websites. Overall, the DRT service is successful and well used by the residents.

2. Car sharing

What is car sharing?

Car sharing is a form of car rental which is more flexible and easier to use than traditional services. Shaheen et al. (2019) defines car sharing as 'a service in which individuals gain the benefits of private vehicle use without the costs and responsibilities of ownership' (p. 1). Individuals typically access vehicles by joining an organisation that maintains a fleet of cars and light trucks. Users subscribe to a service which allows them to rent a vehicle from the fleet of cars, vans and/or light trucks as it suits them.

Provided a car is available, users can book on very short notice and it is also possible to book for very short periods of time. The tariff usually covers all costs, including gasoline and insurance. Reservation, pickup, and return is all self-service, generally administered through a website or online application. Typical models for car sharing programs include (Deloitte, 2017):

- Stationary: Pick up and return of vehicles is at the same fixed place; could be pre-booked. This service is often used for longer trips and locally organised. Providers are located in small cities and rural regions (e.g. drivy, Tamyca, Flinkster).
- Free-floating: Allows customers to pick up and return the vehicle anywhere within a certain area; cannot be pre-booked (e.g. car2go, DriveNow). This model allows for a high level of flexibility. The possibility to use it for one-way trips put it in competition with taxis and services such as Uber. This model is most suitable for areas with high population density and would be difficult to manage in a sparsely populated area.
- Peer-to-peer: Individuals provide their own car for rental by private users via a platform. Often used as a transportation mode for longer distances as compared to traditional car sharing. Pick-up and return is the same location, so only return trips are possible. This model is generally used in rural areas and small cities (Deloitte, 2017).

Relevant sociocultural considerations

As an adaptation of an existing model (traditional car rental), car sharing is perhaps well suited to communities where more radical changes may be difficult to implement and in the absence of public transport services. This model allows people to have access to a car while leaving them in control of the timetable and not creating any expectations with respect to social interaction. This may be particularly attractive for people looking to reduce their environmental impact while retaining complete independence when it comes to mobility.

Village buses
Village buses that are available for rent by the village residents is another 'sharing' solution facilitating rural mobility. For example, social shuttle-busses in the municipalities of Beverstedt and Wurster Nordseeküste in Germany are used and run by the members of the village associations. The bus can be rented via the administration of the municipality.

Population groups which have been identified as potential users of car sharing solutions include socially engaged persons within the local community, persons curious about innovative solutions, persons aware of the cost of owning a private car and economisers (Burkhardt & Millard-Ball, 2016). Furthermore, Matte (2015) have identified two other potential users. The first group is made of persons not owning a car, by choice or by constraint, using public transport when available who see car-sharing as a viable option when public transport is not available, for example, evenings and weekends (Matte, 2015). The second group is made of persons owning a private car who sometimes need larger vehicles such as a van or a small truck. These persons tend to sign in such car/vehicle sharing schemes and end up also using the car fleet.

In small communities with close social relationships, the peer-to-peer model may work well. Alternatively, less tight-knit communities may prefer a model that allows for greater anonymity. Regardless of the type of community, this model relies on having a central, accessible point where the car/s can be parked (e.g. a Mobility Centre/ Mobility Hub). This may make it difficult to implement in a community where the population, amenities and services are quite dispersed.

A further consideration is the role of technology in the solution. In most cases, car sharing models rely on some form of online platform to handle bookings. Prior to implementing this type of solution, it is important to consider how comfortable your target audience is using such platforms. It is also worth exploring whether the internet connectivity in the area is adequate to make it a viable solution for everyone. In the absence of these preconditions it might be necessary to link the solution to an existing service within the community to allow for a physical booking system. Of course, this will limit the flexibility of the service, but it may increase ease of uptake - particularly for social groups who are less comfortable using technology. For this later group, it is crucial to have a user-friendly application for booking a car (Agerholm & Møller, 2015).

What works and why?

The academic literature and reporting of car sharing experiences in rural Europe have highlighted a number of success factors for the establishment and the longevity of a car-sharing programs. Matte (2015) and Steger-Vonmetz & Steinweinder (2014) stress the presence of strong ambassadors who are part of the local community. These so-called "local champions" or "project group of engaged people" play a vital role in the success of car-sharing systems in rural areas. They contribute by sharing their own experience with other inhabitants by communicating the benefits of such services illustrated by personal stories. They also act as a contact person that one can go to in order to gain insight on how to use the system and gain an understanding of what the system includes (e.g. insurance, fuel, etc.). Research comparing two rural areas in Denmark found that the strength of local cohesion and existing local network positively influences the use of car sharing option in rural settings (Agerholm & Møller, 2015).

It is not only the local population that should be an ambassador of the car sharing system in the rural areas. According to Maathijs (2017) and Rotaris & Danielis (2018), the local government should also be an active actor to contribute to its success. Public-sector involvement can happen in different ways.

It has of course the ability to communicate directly with the local population, face-to-face events being particularly crucial. It should also see the possibility to include their own municipal fleet to the local car sharing system when it is not in use (e.g. evenings and weekends). This solution will contribute to greater use of the existing fleet and could even be seen as a financial resource for the local government if a rental fee is put in place. Furthermore, the municipal fleet often includes a mini-van or a small truck that the local population could use for specific events. In one example, Matthijs (2017) mentions the possibility for the user to not only reserve a car, but to also reserve a driver for people without a licence, resulting in a hybrid mobility solution.

Most of rural Europe is characterised by a lack of realistic alternatives to car use. Hence, car sharing rarely replaces the first car in a rural household. However, it can replace the second or third car of the household (Steger-Vonmetz & Steinwender, 2014). Furthermore, the existing social ties in rural areas contribute to keeping the car fleet in a good state. According to Steger-Vonmetz & Steinwender (2014) 'people sharing a car in a small community know each other, they are all interested that the system works. The loyalty and responsibility taken by the participants is much higher than in commercial systems. Small workings (e.g. cleaning) are done by the members themselves and the operator doesn't have to pay for it' (p. 4). A car fleet in good condition and composed of relatively new vehicles also makes a positive contribution to the success of the car sharing system, creating an extra motivation for the local population to use such cars (Shaheen et al., 2009).

In Belgium, there are several pilot car-sharing initiatives operating in rural areas which include 4-5 elderly people sharing one car. The results show that the elderly trust their own peer group more than they trust other groups - an important conclusion to be taken into account when planning car sharing solutions (Matthijs 2018).

When it comes to finding the best pricing for rural car sharing systems, experiences in Austria have highlighted that the combination of a high fix costs (i.e. membership fee) and a rather low usage fee contributed to increased vehicle usage (Steger-Vonmetz & Steinwender, 2014). This links the success of car sharing fleet with informing potential users on the usage cost of such cars vis-à-vis a private own car. According to Schaefers (2013), stressing the financial benefits to households increases their motivation to use car sharing systems. The car sharing booking system should allow to plan a trip in advance (i.e. at least 24 hours before), to satisfy the needs of potential users. Agerholm & Møller (2015) have shown that a certain planning time is often required for car sharing trips in rural Denmark.

Common (sociocultural) barriers to success

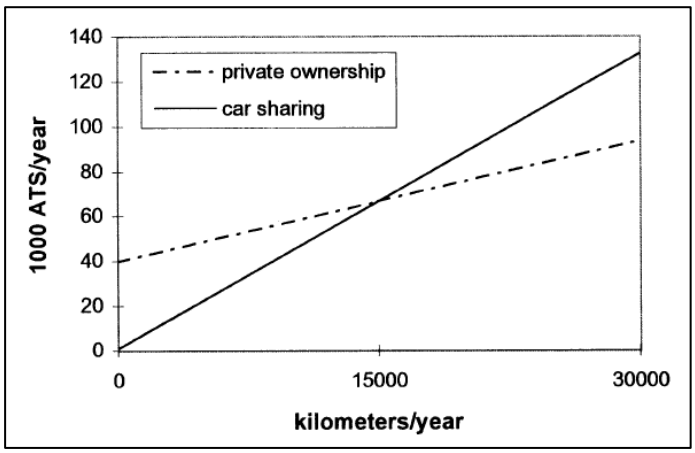
The literature about car sharing experiences in rural areas has highlighted a number of sociocultural barriers for the establishment and the longevity of a car sharing program.

Distances in rural areas tend to be further than distances in urban areas, reducing the advantage of trips using a car sharing scheme vis-à-vis a privately-owned car. According to Prettenthaler & Steininger (1999), car sharing schemes are more financially competitive than a privately-owned car until a certain annual distance. Figure 1 shows that, in that specific example, the threshold was around

15,000 kilometres per year. The authors pointed out that regular trips such as commuting trips might therefore most likely done by private car, whereas less systematic trips (e.g. leisure trips) for instance might be more suited to car sharing options.

One of the main barriers for participating in a car sharing system in a rural area is the high level of car ownership (Agerholm & Møller, 2015; Rotaris & Danielis, 2018). The flexibility and the comfort of owning a car often provides little room for considering other means of transport, thus limiting the success of car sharing programs in rural areas. Other socio-cultural barriers are the difficulty in findingincreasing the number of users (Crucke & Slabbinck, 2019)

Figure 4 The cost of mileage-service: private ownership versus car sharing (Source: Prettenthaler & Steininger, 1999)



Experience from MAMBA

A car sharing scheme aiming at improving mobilities has been developed in Geestland, a small town located in the county of Cuxhaven (Germany). The town has ca. 30 000 inhabitants and is composed of several small settlements across its territory, resulting in low population density and limited public transport services. The target users of the car sharing scheme (with a fleet of one shuttle) are young and old people, as well as small group of people, with a need to travel to neighbouring settlements within the municipality.

A key element explaining the success of car sharing in Geestland is the important involvement of a local association, namely the "Verkehrsverein Neuenwalde". Its involvement is on a voluntary basis and greatly contributed to introducing and promoting the car sharing scheme to the local population. The relatively small size of the community and the existing social ties are socio-cultural characteristics which are also important to the success of a car sharing scheme due to the population having a certain responsibility in keeping the car fleet in good condition.

The engagement of the local government, for example, the county administration, is another success factor in Cuxhaven thanks to its knowledge on how local transport is organised. Finally, the

car sharing scheme in Geestland is an attractive rural solution for the users aiming at reducing their environmental impact thanks to the purchase of an electrical vehicle.

The main socio-cultural difficulty in the existing car sharing scheme in Geestland is related to finding a more durable way to communicate this mobility solution to local inhabitants in the county, including finding the financial resources to run these communication activities.

3. Ridesharing

What is ridesharing?

Ridesharing involves sharing spare seats in vehicles with travellers going in the same direction. Tavory et al. (2020) defines it as 'the act of two or more people sharing a driver's predesignated trip' and highlight that ridesharing has existed since private cars became affordable (p. 270). In the past, ridesharing has generally arisen from spontaneous bottom-up self-organisation of family members, friends or neighbours. More recently however, ridesharing has taken on another dimension thanks to new technologies allowing for the organisation of ridesharing between people who were not previously connected (Joseph, 2018).

When designing a ridesharing solution, it is important to acknowledge the different kinds of trips that may take place. Furuhata et al. (2013) developed a typology of these different types of existing ridesharing patterns. They identified four main patterns:

- Identical ridesharing: the origin and the destination are the same for both the driver and the passenger(s).
- Inclusive ridesharing: the origin and the destination of the passenger(s) are within the trip made by the driver.
- Partial ridesharing: the passenger(s) need(s) to complement the trip with other means of transport, since the driver carries out only a portion of the passenger(s)'s journey.
- Detour ridesharing: the driver is willing to make a detour to pick-up a passenger.

Arrangements can be made through a matching service or through an informal agreement between friends or acquaintances. The most common model connects drivers and passengers through an online platform which requires a pre-registration. Platforms range from as simple as Facebook groups adapted for the purpose to fully tailored mobile applications. The majority of ridesharing platforms are not-for-profit and are often bottom-up initiatives organised by citizens themselves. In some systems, drivers are permitted to charge a small fee for the ride or, particularly on longer rides, it is common to split the cost of fuel (Tavory et al., 2020).

Relevant sociocultural considerations

Academic evidence on ridesharing in rural Europe is quite limited, with findings combined with either those from urban areas or car sharing. However, a couple of sociocultural considerations can be

highlighted, mostly based on different ridesharing projects in rural areas of Europe. As with car sharing, ridesharing also has strong potential to enhance rural mobility and increase local ties between users (Parker et al., 2011; Gray et al., 2001). It has been highlighted in the literature that ridesharing is more common in rural areas with strong local ties (Gray et al. 2001; Choi et al., 2019). Ridesharing is also seen as a means to increase the connection between people (e.g. between drivers and passengers), and the literature suggests that people seeking a stronger community feeling tend to see ridesharing as an attractive mobility solution (Zmud & Rojo, 2013).

The motivations for starting up a ridesharing platform are varied. A study by Parker et al. (2011) found that cost-saving and environmental considerations were among the main motivations for residents in rural parts of the U.K. to participate in ridesharing. Other studies in the U.S. and Europe mentioned in Tavory et al. (2020) confirm that cost-saving (including time saving) and environmental considerations are among the two main motivations. In Sweden, for example, the initiators of Mobilsamåkning wished to reduce their environmental impact and increase social interaction within the community by reducing the number of cars on the road occupied by only one person. That seems to be particularly the case in places with a substantial share of environmentalists, generally urbanites who recently resettled in the countryside to pursue a greener lifestyle who do not own a private car. In Latvia, the Facebook group Valmiera-Riga-Valmiera was motivated more strongly by the desire to offer flexible and cost-effective mobility solutions. Mobilfalt, a project of the public transport companies in Hesse (Germany), has a similar motivation.

What works and why?

The geography of the place matters for ridesharing. Ridesharing is more successful in areas where people tend to travel in the same direction. For example, a small settlement with a regional centre located less than 50 km away with limited public transport. According to the MAMBA good practice example Mobilsamåkning, the success rate may drop if there is more than one larger town around. [4] Ridesharing may be better suited to locations with more dispersed populations than car sharing as the driver can pick up the passenger if necessary.

However, ridesharing is not the most appropriate solution for all kinds of trips. Trips for commuters, for doing shopping and for leisure activities tend to be the most common kind of trips where ridesharing is used as a mobility solution in rural areas (Gray et al., 2001). The Mobilsamåkning experience shows that introduction of a ridesharing scheme can lower the pressure on parents in villages with many children taking music lessons or playing soccer or other sports that require recurrent rides at odd times. Based on two successful ridesharing platforms, Mobilfalt (Germany) and Mobilsamåkning (Sweden) the following target groups are considered most likely to adopt ridesharing as a mode of transport:

[4] Interview with Pepijn Klaassen (Mobilsamåkning), 22 January 2018

- Work commuters are *the backbone* of the ridesharing service
- Kids and teenagers without drivers-licenses/cars
- Green lifestyle pursuers who might recently have left town for the countryside
- Villagers with hobbies that require a ride (soccer, music lessons, etc.)
- Retirees with time to help/drive others and the desire to meet people in their cars
- Villagers longing for more socialising and meeting places – in cars and elsewhere

The German initiative ELLI expands the concept of ridesharing to include volunteer drivers giving people rides for specific purposes, as opposed to simply because they are going in the same direction. When approached in this manner, ridesharing programs may be ideal for elderly people without the ability to drive to, for example, medical appointments, shopping trips.

Based on the best practice examples gathered by the MAMBA team, other key success factors encountered when trying to implement ridesharing programs in rural areas include:

- Using flexible systems, for example, platform that will work on older mobile phones or on a desktop computer, ability for children to use the parents account (Mobilsamåkning).
- Using existing bus stop infrastructure as meeting points (Mobilfalt). Pick-up/drop-off places decided by the users, including the grocery store can also be included in the system by placing the main drop-off/pick-up place outside and increase traffic there (Mobilsamåkning).
- Having high level of buy-in from local community (Latvian Facebook group Valmiera-Riga-Valmiera; Mobilsamåkning; ELLI). In the case of ELLI this also meant pro-bono support which led to a strong commitment to the solution once it got started. Engaged community members also makes it easy to take a "learn by doing" approach, get ongoing feedback on the service and adjust it to better meet community need. Top-down solutions don't seem to work so well as bottom-up (Mobilsamåkning).
- Using a familiar platform (e.g. Facebook) makes the network accessible to most people as well as being easy to grow. This will also saves substantially on costs (Valmiera-Riga-Valmiera). If there is already a local transport application/platform in place, integrating with this could save a lot of time, money and energy. It also means that the majority of your target audience will already be engaged with the platform and can easily learn about the solution (Mobilfalt). If you do plan to develop the system yourself make sure you have access to the right expertise, for example, an IT person in the start-up group (Mobilsamåkning).
- Creating a win-win situation. Ridesharing should be cheaper and more convenient than other options (Valmiera-Riga-Valmiera).
- Appointing community ambassadors to inform people about the project (Mobilfalt).
- Having a dedicated group of individuals to get things stated and keep them going.

Common (sociocultural) barriers to success

One of the main sociocultural challenges of ridesharing, and indeed many other innovative mobility solutions, is limited flexibility (Parker et al., 2011). Another sociocultural challenge that is more unique to ridesharing is security concerns, in other words "stranger danger" which may arise when travelling with someone one does not know beforehand (Tavory et al. 2020). Ridesharing does require a somewhat higher degree of trust between the two parties than other mobility solutions. This can be addressed using different types of security measures, for example, driver's license checks or other approval processes. It is nonetheless also important that security measures are not so onerous that they deter potential drivers.

Another challenge is a lack of knowledge and information on the available ridesharing solution (Parker et al., 2011). Parker et al. (2011) propose several measures through which public authorities could support ridesharing, including promoting and highlighting ridesharing in local transport plans and other steering documents, strengthening marketing efforts, developing strategies for monitoring and evaluation, making use of private and public advocates for ridesharing to encourage ridesharing at workplaces, and launching demonstration projects. The authors argue that these types of solutions may play a significantly greater role in rural mobility in future without necessarily requiring so much investment. In general, about 25 % of the population in a village will start using a ridesharing service after some initial marketing to encourage behavioural change, such as accepting the idea of driving your neighbours – or to have a neighbour drive your child. This is a conclusion drawn by Mobilsamåkning based on user statistics from 16 attempts to implement their system in Sweden (of which 13 succeeded). This also implies that around 75 % of people in any given community are not interested in ridesharing.

Based on the best practice examples gathered by the MAMBA team, other key challenges encountered when trying to implement ridesharing programs in rural areas include:

- Administration can be time-consuming (Valmiera-Riga-Valmiera)
- Poor internet service (ELLI)
- Bottlenecks occurring in villages or areas that are very sparsely populated with limited traffic and few daily commutes to an urban centre (e.g. southern Öland). (Mobilsamåkning)
- Villages where most inhabitants have two cars and prefer to drive alone. This is typical in Sweden and probably other countries where people can afford to have two cars and appreciate the freedom and flexibility of driving alone. (Mobilsamåkning)
- Conflicts or conflicting interests in the village that hamper implementation, for example, with small, local taxi companies. This can be addressed by adding taxi reservation as an option on the ridesharing app and explain that it is a different service, always on time. It might still make sense for people to order a taxi rather than ride share under specific circumstances, for example, when they have a flight to catch. (Mobilsamåkning)

Experience from MAMBA

NABOGO is ridesharing platform that aims to improve mobility in Smidstrup/Skærup (Denmark), a small rural area of 800 inhabitants. The area is just 14 kms from Vejle city centre but the bus connections are limited. The target users for the app are young people traveling to Vejle for school or people without a driver's licence that need to reach public service in Vejle. It can also be used by older people who want to participate in social events.

A key element explaining the success of the ridesharing platform in Smidstrup/Skærup is the existence of strong ties within the local population. The feeling of being part of a local community is mainly expressed through local events (e.g. sporting events). The new ridesharing platform provides yet another possibility for the population to meet. Furthermore, the strong local ties and the small size of the population reduces the risk of "stranger danger", which has been found to be one of the main sociocultural barriers in implementing ridesharing solutions in rural areas.

In the early stages, the NABAGO team were out and about meeting potential users of the platform in public places (e.g. the supermarket, local sports arenas), providing information about how to use the ridesharing service and answering questions. There were also articles and interviews in the local media. The diverse range of avenues through which the public could learn about the service was part of its success. Discussions with potential users also gave the opportunity to address some of their concerns. For example, will this new service result in the closure of the existing bus service?

Finally, the geography of the area contributes to the success of the ridesharing platform in Smidstrup/Skærup. The locality is situated ca. 15-20 kilometres away from the city centre of both Vejle and Fredericia, two important regional centres. Thus, the chances of people travelling to the same destination are greater than if there were a range of smaller destinations in the vicinity.

4. Mobility as a service (MaaS)

What is Mobility as a service (MaaS)

Mobility as a service (MaaS) is a concept that offers multimodal and sustainable mobility services from A to B by integrating planning and payment using a one-stop-shop principle (Aapaoja et al., 2017). It is based on dynamic data and consumer-defined travel preferences.

"*The great vision in the MaaS concept is to connect all available transport and mobility services in a one-stop-shop package and hence provide an agile, sustainable and efficient competitor to private cars, which can be tailored according to the needs of end users*" (Aapaoja et al., 2017).

MaaS enables customers to buy a mobility subscription which incorporates different physical transport modes such as buses, trains, taxis, bikes and car sharing in a single app. A desired combination of the types and amount of transport is decided by the user or household (Li and Voege, 2017).

As various MaaS solutions may differ in their offer, Jittapirom et al. (2017) used the academic literature to define nine core characteristics, that most MaaS initiatives have in common:

1. Integration of transport modes
2. Tarif option (package or "pay-as-you-go")
3. One common platform
4. Involvement of multiple actors
5. Use of new technologies
6. Demand orientation
7. Registration requirement
8. Personalisation to end-users needs
9. Customisation on preference

MaaS is a new paradigm in mobility, as it promotes a modal shift from private car ownership and encourages users to pay for mobility services instead of investing in their own vehicle.

MaaS is a rather new concept that has been mainly tested in the urban context. Among the most well-known cases in the Nordic countries are Whim in Helsinki and UbiGo in Gothenburg. MaaS in the context of rural areas has gained some attention in Finland. For example, Rural-MaaS was a yearlong (2016-2017) national project funded by the Ministry of Agriculture and Forestry. Another MaaS project was piloted in Ylläs area in Finland in 2016.

MaaS in rural Denmark is currently in the planning phase by the Transport Authority of Northern Denmark. The new mobile app will guide users to the most convenient and cheapest mobility services available on a selected route from A to B – public as well as private options (e.g. carpools, shared cars, ferries, taxis, and transport-on-demand busses). In a future version of the app, users might also be able to pay the whole trip in one go, regardless of how many service providers are involved. There are still some hurdles before this will become a reality.

According to the CEO of UbiGo, Hans Arby, there is a difference in the societal goal and motivation between MaaS in urban versus rural areas. While the goal of MaaS in urban areas is to limit car ownership and usage, thereby changing peoples' mobility behaviour, the main motivation for MaaS in rural areas is to increase accessibility. Making it possible to live with one or no cars is of secondary importance in rural areas.[5]

Relevant sociocultural considerations

MaaS is an end-user-oriented approach and builds on a good understanding of the customers' (and service providers') needs. Therefore sociocultural considerations are central for ensuring the success of MaaS (Aapaoja et al., 2017). According to Pöllänen et al. (2017), the demand for a service like MaaS is most likely highest for the segments of the rural population that do not own or use a private car, regardless of the reason. Drivers of private cars tend to be more attached to owning a car than the passengers in private cars, the latter are more likely to be open to a concept like MaaS because it

[5] Interview with Hans Arby (UbiGo), 17 May 2018

would not mean a great change in their travel experience (see also Fioreze et al., 2019; Geurs et al., 2018; Laine et al., 2018).

For this reason, those aged 15 to 24, were identified as an especially interesting target group for MaaS, as there is a higher chance that people in this age group do not own cars and, even where they do, their travel habits are likely to be less fixed. Based on an evaluation of a MaaS pilot in the rural Netherlands, Geurs et al. (2018) suggest targeting students and travellers performing infrequent trips (day trips or business trips). Given the high share of people aged over 65 years of age in rural areas, it is also important to consider how MaaS could be adapted to serve the needs of this demographic group (Pöllänen et al., 2017). Behavioural change may be more challenging here, as older people are more likely to be locked into their mobility practices.

Data from Finland shows more than half of the households consisting of four persons or more have more than one car (Pöllänen et al., 2017). Herein lies a challenge for MaaS – how to make the service attractive for these households. MaaS pilots have shown that MaaS can provide several perceived benefits, such as convenience, flexibility, and perceived increased access to mobility options (Karlsson et al., 2017). At the same time, it may take some time to gain acceptance from the end-users (Aapaoja et al., 2017) which is especially important as Fioreze et al. (2019) stress the importance of positive attitude and curiosity towards MaaS within the population for a MaaS service to be successful.

What works and why?

MaaS is not a rigid concept and can be adapted to work in different environments. In more remote areas MaaS may need more public support than in areas where the demand for transport is high and the service can be fully commercially exploited (Pöllänen et al., 2017). In rural areas in Finland, MaaS is promoted for its potential to increase the efficiency of statutory social and health service transportation (i.e. trips for disabled and elderly persons) by connecting the organisations responsible for these trips to the MaaS service (Aapaoja et al., 2017). Combining logistics services as well as school and statutory social service transportation with MaaS is seen to be an efficient solution for future development of rural areas (Aapaoja et al., 2017; Eckhardt et al., 2018).

The more personalised approach to mobility services offered by MaaS could benefit residents who find it difficult to use traditional public transport, such as people over 65 years of age, people with disabilities or foreigners, by easing access to door-to-door transport provision (Aapaoja et al., 2017). The solutions for MaaS in rural areas should be based on strong social capital and trust between people in smaller localities.[6] This would increase the potential for integrating peer-to-peer car sharing services rather than initiating a commercial car sharing as part of rural MaaS.

It is very expensive for a single transport authority to develop a MaaS system. Moreover, people have high demands regarding the functionality of such service, even in rural areas, meaning that the app must be easy to use. In this sense, having a general technical business platform for MaaS that could

[6] Interview with Hans Arby (UbiGo), 17 May 2018

be used and adapted to the needs of each municipality could be a better solution (e.g. as is being done by the NT in Denmark, see case study MinRejseplan).[7]

MaaS in rural areas might not develop into a commercial service but it might still result in cost-saving for the public transport authorities through reducing expenditures on public buses and subsidising MaaS instead. A more substantial analysis into the validity of this claim is currently being conducted as part of a Swedish Innovation Agency funded pre-study on the possible sustainable business models for mobility in rural areas in Sweden.[8]

The key to a successful implementation of MaaS in rural areas is the collaboration between businesses, the public sector and citizens to achieve a higher economy of scale (Aapaoja et al., 2017). A fully operational version of MaaS also requires considerable trust between the companies providing the service, authorities, and investors as well as support from those responsible at both the strategic and operational level of the transport sector (Eckhardt et al., 2018; Smith et al., 2018).

Common barriers to success

The general obstacles to the viability of MaaS are mainly of an institutional and regulatory nature. At the individual level, the sociocultural barriers to the adoption of MaaS were found to include efforts associated with having to learn how to use a new service, create new habits and routines (Karlsson et al., 2017).

A clear bottleneck with Ylläs Around application was the technical weaknesses faced during the implementation. The system didn't count the price right, which leads to a situation where taxi drivers didn't want to drive those trips (Anttila, 2018) (read more: Ylläs Around and YlläsTiketti case study). Challenges in developing a common payment system have also been identified as a barrier in case of MinRejseplan in Denmark. The challenges include, for example, a lack of interest among the different transport providers to share data about their customers, and difficulties in pooling payment systems between private and public actors. The service providers need to be convinced that MaaS will not increase competition. Instead, it will increase the number of travellers by making sure different travel modes can be combined[9] (read more: MinRejseplan case study).

Hauptmann (2018) made the following observations about the psychological aspects of (mobility) behaviour and MaaS:

- The hypothesis of MaaS is that multimodal real-time traffic information and more predictable travel chains may induce people to leave their cars at home. An important consideration concerning MaaS and mobility behaviour is whether extensive information on mobility options and travel chains complicate the decision-making process and may instead lead to a perceived loss of control. Too much information may weaken decisiveness.

[7] Interview with Nicolai B Sørensen (Transport Authority of Northern Denmark), 28 February 2018
[8] Vinnova's Kombinerad mobilitet på landsbygd och i mindre tätorter - förstudie
[9] Interview with H. Ylipiessa (Ylläs Travel Association), 4 May 2018

- Another question mark is whether a monthly subscription to mobility services is something that will be perceived as positive from the user perspective. The user may wonder whether they have fully utilised their monthly mobility subscription. One opportunity could be to make it possible for MaaS users to save unused mobility for next month.

To sum up, when planning and implementing a MaaS service the characteristics of rural areas should be taken into account. A SWOT analysis for rural mobility in Finland by Eckhardt et al. (2018) identifies several of such factors. Firstly, rural spatial patterns like low and sparse population distribution and long distances challenge the operation process. Other examples are legislation and financial restrictions as well as a "silo effect" within and between organisations. In contrast, good local knowledge and trust are perceived to be a good foundation for success, in particular collaboration with stakeholders. Provided the appropriate ICT infrastructure is in place and the level of digital literacy within the population is adequate, MaaS has the potential to be a fruitful mobility solution for rural areas.

Experiences from MAMBA

Mobility patterns within the sparsely populated **Region of North Karelia (Finland)** are characterised by long distances between people and services, declining public transport services outside the regional centre and an ageing population. Where public and commercial transport services do exist, information is fragmented. As a result, private cars are the primary mobility solution for most residents.

To address these circumstances, the Regional Council of North Karelia developed **POJO**, an online platform which provides real-time travel information on all existing mobility options. The service incorporates all of the key features of MaaS listed above, with the exception of a common payment solution. Given the particular sparsity of the region, the service was not intended as a genuine alternative to car ownership, as it often the case with MaaS. Instead, the aim of the service was to provide an incentive to forego the second car and to ensure better accessibility in general (e.g. for those who cannot drive). The initiative targets residents as well as tourists and is intended for a range of trip purposes, such as commuting or leisure activities.

The region dealt with some specific socio-cultural determinants, which enabled the success of the service on the one hand but acted as barriers to implementation on the other. Enabling factors included high levels of broadband connectivity within the region and strong collaboration between regional stakeholders. The openness of the residents to new mobility solutions and a higher willingness to use public transport if the service was better also facilitated a smooth implementation process.

The main challenge was the relatively high share of residents who were not familiar with such digital solutions. As such, considerable time was spent upskilling these residents and encouraging them to use the service. Another challenge was securing the sustainability of the service, in particular determining who would be responsible in the long term. This challenge was addressed by splitting responsibilities for different parts of the platform between different stakeholders and setting up automated reminders to ensure that the respective people update the platform regularly.

5. Combined transport solutions

What is a combined mobility solution?

Addressing accessibility and mobility challenges in rural areas calls for an integrated approach that goes beyond thinking in terms of separate modes of travel.

By combined / shared transport and mobility solutions we refer to a variety of different initiatives, such as:

- passenger or private transport used for the transport of goods (see text box);
- goods carrying services offering passenger transportation;
- different combinations of passenger transport (combining specialised public transport and regular passenger transportation).

A combination of different services contributes to cost reduction for service providers and end users, increasing efficiency and providing environmental benefits. Moreover, combining goods / services transport with regular public transport is an effective way to improve service-to-people mobility.

Freelway is an app/service transporting goods between persons (and businesses) in Sweden by using existing rides. As an individual, one can register in the platform and help others to deliver goods and packages. Freelway HIT allows businesses to coordinate their transport of goods and staff via better planning and sharing of rides. Freelway GO is a free app for private persons looking for ride sharing of goods via existing transport carriers in the system.

KombiBus is a bus service that combines passenger transport with freight and post-delivery in Germany (read more: KombiBus case study)

Relevant sociocultural considerations

The success of combined transport solutions depends to a high extent on having good knowledge of the target groups and their needs and preconditions for mobility, since the mobility offers and routes should be adapted to the needs of the users of the services. Moreover, collaboration and coordination among the stakeholders and different policy areas are vital for success, indicating the importance of the governance-related factors.

What works and why?

In their research on accessibility of health services for aged people in rural Ireland, Ahern et al. (2010) and Ahern and Hine (2013) argue that there is a need to increase both synergies between transport operators and health service providers, and coordination between government bodies responsible for health policy and those implementing transport policy. Among the conclusions of Ahern and Hine (2013) was that, with greater communication and cooperation, DRT solutions could be linked to other public transport operators and public services (e.g. healthcare services). Collaboration among the associations (social and health care) regarding sharing of vehicles and transport of patients to doctor appointments and leisure activities could also be further promoted. Furthermore, other research has found that coordinating the timing of doctors' appointments and scheduled public transport services was crucial in the case of the Local Link bus service in rural Ireland (Mc Kenna 2017).

According to an international literature review on mobility and transport solutions in rural areas by Berg and Thoresson (2017), ensuring an increased coordination of special transportation services, public transportation and school buses is an important precondition for developing a well-functioning transport system in rural areas. In several municipalities in Skåne Region in Sweden, for example, the school bus service was combined with regional bus lines to ensure better connectivity. Another example of a successful project was a collaboration between Flexi-bus[10] and the Wheelchair Association services to identify users of the latter service who were on the Flexi-bus route. This resulted in cost savings for the Wheelchair Association without extra cost to Flexi-bus. Further, it linked customers to the Flexi-bus service, giving them access to greater mobility than the Wheelchair Association was able to offer (Canny et al., 2010).

"Collect and connect" services provide a permeant pick-up point in a rural town where people can catch a bus linking to a regular commuter service in a larger town (e.g. as part of the Mobility Centre/ Hub). In a U.K. transport project, this type of service was found to be effective only when it could provide several services in the morning and evening every week day and when ticketing could be integrated with the broader system (i.e. the link would be covered under the regular commuter ticket price) (Canny et al., 2010). As a result, the service turned out not to be commercially viable. Lack of facilities (e.g. shelter) at the pick-up point was also found to deter use. Finding other uses for the vehicle during the day was thought to be important in making the service more viable (e.g. on Thursdays and Fridays it operated a "shopper service" (Canny et al., 2010).

When integrating transport services, it is important to take into account that the needs being met by the existing service may be more complex than getting from A to B. For example, an attempt to replace a DRT service with a "collect and connect" service failed because: 1) drivers on the "collect and connect" service were not able to provide the same level of support to passengers (e.g. for those with reduced mobility); 2) passengers were unwilling or unable to access centralised bus stops; 3) the time savings offered by the new services were irrelevant to service users for whom the trip was their only activity for the day - in fact, for many, expediency was a disadvantage as the trip was also seen as a social activity; 4) integrated tickets were not available, meaning passengers had to purchase an additional ticket to use the service (Canny et al., 2010).

In case of KombiBus, the development of a digital platform for ride scheduling and booking contributed to the success of the initiative. With this system, freight capacity of different transport providers can be viewed and connected to optimise the journey. Above all, however, KombiBus's success can be attributed to the support from various stakeholders at the national and regional level, and an effective collaboration with the local authorities, the regional transport company and the business sector (the manufacturers and producers in the Uckermark Region). Because the project was backed by the Ministry of the Interior, it had a legitimate 'label' and was generally trusted by the partners. Another great support came from the first big partners in the region. They acted as

[10] Flexi-bus is equipped to service passengers who use a wheelchair

multiplicators, both showing other potential partners that the project was viable and using their regional business network to actively look for more partners. Overall, communication, constant marketing, publicity and persuasion were found essential for successful implementation.[11]

Common barriers to success

Legislative barriers are the main obstacles for combined mobility solutions. For example, child protection guidelines can be a barrier to broader utilisation of school transport services (Canny et al., 2010). Governance and coordination-related barriers can also hinder technical and financial integration between mobility operators. General lack of coordination and integration between service providers and policy makers (e.g. health and transport) is also a common barrier.

Governments should be aware of the dangers of piloting integrated solutions without first ensuring that there will be resources available to continue them if successful. Past experience of "short-lived" transport solutions have been found to hinder uptake of new solutions in the future (Canny et al., 2010). It may also take time for people to hear about a solution or gain the confidence to try something new.

In case of KombiBus, the biggest challenges in the pilot phase were convincing the users of the feasibility of the concept and persuading them to cooperate. Although the concept of combined passenger and freight transport has existed before in Germany, the producers and customers were initially sceptical. A shift in thinking was required as producers and customers had a centralised market mindset, believing that goods must be bought at a central market in a medium-sized or large city.[12]

6. Service-to-people

The service-to-people approach aims to increase accessibility to services among the residents in rural and peripheral areas. It is an integrated approach that puts the needs of the inhabitants and the community at the centre and is designed to enhance quality of life in rural and peripheral areas. Services may be delivered in a combined or single form, physically and digitally, and address particular needs and different population groups. Although service-to-people approach is not a mobility solution, it does increase accessibility to services and thus was included in this study as a separate category due to its high importance to the project partners.

The European Network for Rural Development (ENRD) (2018) identifies three models that can loosely be described as service-to-people solutions (see Figure 3). The first is integrated service delivery, including the co-location of several services in one building or space. The second is alternative and flexible delivery approaches. This includes mobile services, for example, services that move from place to place, serving different parts of the community at different times (e.g. mobile libraries) or services that visit residents in their homes (e.g. meals services for elderly residents) (see example in a

[11] Interview with Markus Krüger (KombiBus), 2 May 2018
[12] Interview with Markus Krüger (KombiBus), 2 May 2018

text box below). The third and final approach is digital solutions (e.g. e-health), which are increasingly discussed as a viable way to address service gaps in rural communities.

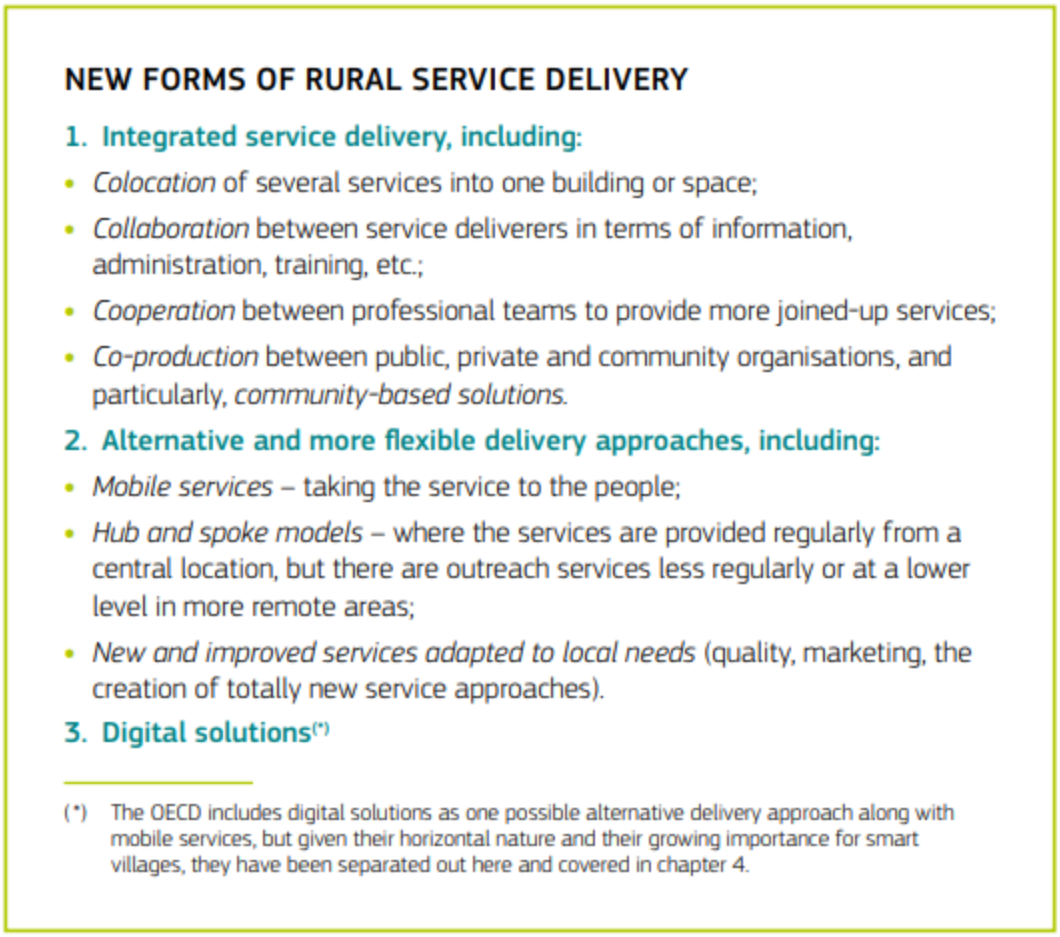


Figure 5. New forms of rural service delivery (Source ENRD 2018).

Relevant sociocultural considerations

Knowledge of the service gaps and needs of the residents is an important precondition for developing successful service-to-people solutions. Many of the initiatives that increase access to services in rural areas emerge through a bottom-up approach relying on strong social ties and driven individuals and volunteers within the community.

Mobile services – taking the service to the people in Latvia

Samaritan Mobile Care in rural areas in Latvia is an initiative run by an NGO. It provides home support services, mainly to people over 65 years of age. Samaritan caravan visits people at home and is equipped with an autonomous power generator, a shower, a toilet, a washing machine, specialised equipment for foot care and haircutting. While the person receives care, the social worker cleans up the house and helps with other tasks, for example, preparing firewood. The initiative was selected as one of 10 finalists in the European Commission's Social Innovation Competition, out of 1,400 projects from all over Europe (Samariesi 2018).

When it comes to service users, sociocultural considerations will depend on the type of solution offered. Services that visit people in their homes may work well for elderly residents or those who have difficulties leaving their homes. It is important to acknowledge however that these services may be limited in their ability to offer social interaction. Digital services have a similar limitation, meeting the service need but not necessarily replacing the activity previously associated with accessing the service (e.g. downloading an online book as opposed to visiting the library).

Multi-service hubs may be more effective in meeting social needs as they provide a physical venue where the community can come together. At the same time, the fixed geographical nature of such venues implies that some other form of mobility will be required in order to access the services. As such, this type of solution is perhaps best suited to communities where the population is clustered around a centre of some sort. Where the population is more dispersed, it might be necessary to couple a service centre with another mobility solution (e.g. DRT) in order to ensure access for those in the community who do not have their own transport. Alternatively, mobile solutions that visit different places at different times could be useful in providing central meeting places in different geographical locations on an intermittent basis (ENRD, 2018).

Digital solutions are one possible innovative service-to-people delivery approach. Digital solutions are gaining popularity in Europe as means to provide more targeted and cost-effective home and healthcare to remote rural populations. When used correctly, such solutions have a potential to improve both the quality of care (e.g. through remote monitoring possibilities and logistical improvements) and social cohesion (see example in text box) (ENRD, 2018).

What works and why?

Multi-service hubs provide one means of improving accessibility of services in rural areas with low population density. Co-locating services helps small rural businesses providing services to survive, or even thrive, by helping to reduce economic risk, reduce costs and save resources. Different services can be co-located, such as the groceries store, a post office and some small businesses.

E-health care in rural Germany.
The AGnES programme in Germany allows general practitioners to use specially trained nurses to make home visits and provide routine medical procedures. Nurses use a tablet-PC to communicate patients' health information to the general practitioner in real time. When necessary, video-conferences are used. In addition, technologies for distance monitoring of blood pressure, weight and additional health parameters are being explored (OECD 2015).

Service Centre in Kalix Övre Bygden in Sweden is one example where co-location has been successful in retaining services within a rural area. It began when the economic association established by the residents in 1995 took over the management of the local store. Gradually, the service centre expanded its activities to the provision of a home care service and a taxi service for school children. The Service Centre rents out office spaces in the old station house. It also rents its employees to different businesses in the village to perform various maintenance jobs in the field of construction, cleaning, gardening, etc.[13]

Another example of a multifunctional village centre is a MarktTreff concept that started in Germany in 1999 and is currently established in 39 communities. The local grocery store is the core business that is supplemented by other services (e.g. a second-hand shop, hairdresser, massage studio, cosmetics studio) depending on the needs of the community. The solution relies on some volunteer support (Schmiedek-Inselmann 2018) (read more: MarktTreff case study).

Village House Service Centres were established in the most remote villages of the municipality of Ilomantsi, Finland, to bring various services to the inhabitants in 2014. Different services are available in the service centres on a weekly or monthly basis (based on reservations made by the village inhabitants). The service providers are both small enterprises and municipal officials (e.g. nurses from municipal health-care centres). The services and activities provided include healthcare, a hairdresser, foot care, various educational courses, events, small trips and food services. The coordination of centres' activities and the service providers is now the responsibility of the volunteers at the village associations. The space provided at the village houses can be used free of charge, which made it easier to attract private service providers (read more: Village House Service Centres case study).

Common (sociocultural) barriers to success

As noted above, the wide variety of service-to-people approaches make it difficult to identify specific sociocultural barriers to success. Common to all solutions however is the need to match the solution to the specific needs of the community. Thus, engaging community members in the development of

[13] Interview with Eliasson, M. (Service Centre in Övre Bygden) on 16 September 2016.

any solution is vital, as is supporting bottom-up initiatives that come directly from the community themselves.

Experiences from MAMBA

Hallig Hooge is an island on the west coast of Schleswig-Holstein (Germany). It covers an area of 5.78 km2 and is home to 109 people. During large storms, parts of the island become submerged. The ferry from the mainland to Hallig Hooge takes approximately 1.5 hours and the island has few cars and no public transport. A doctor visits once every two weeks and, in case of emergency, a paramedic lives on the island. Residents are also connected with the Hospital in Kiel via Telemedicine. Other than a grocery store, there are no services on the island.

Through the MAMBA project, the team at the Diaconie of Schleswig Holstein sought to improve the quality of life of the Hallig Hooge inhabitants by developing mobile and online counselling services. A particular focus of the service is supporting people to grow old on the island. By 2030, almost half of the existing residents will be over 65 years of age and many have concerns about whether it will be possible to remain in such a remote environment as they get older.

The inhabitants of Hallig Hooge have been heavily involved in the project development process. Regular, face-to-face meetings are held on the island with approximately 20 residents attending each one. These meetings are vital in developing a rapport and ensuring buy-in from residents once the service is up and running. This is particularly important in the context of the target demographic – many of whom have limited experience with online solutions. Interestingly, the participatory process itself has been somewhat therapeutic, providing an outlet for residents to discuss their concerns and fears about growing old on the island. The team also works closely with the major of Hallig Hooge. This was particularly important in the beginning in establishing engagement and building trust with the residents themselves.

CONCLUSION

This study has highlighted the sociocultural factors that influence the uptake of innovative rural mobility solutions. It has considered these factors in a general way as well as relating them to the specific mobility solutions that were piloted in the MAMBA partner regions. Broadly speaking, the study found three types of factors that influence the uptake of innovative rural mobility solutions, individual related factors, context-specific factors and governance related factors.

The individual-related factors found to be the most relevant included age, gender, attitude, lifestyle, and socio-economic status. Importantly, the study found that, while simple categories like 'elderly', 'youth', 'men', 'women' may offer some insight into travel behaviour, it is equally important to acknowledge the diversity that exists within these categories.

When it comes to context-specific factors considerable diversity can be found across the Baltic Sea Region, both between countries and within them. Regional development potential shows a clear east-west divide, with countries to the west of the region showing higher potential for positive economic

and social development. Population development is also varied across the region, with Finland and the Baltic States the most severely affected by population decline in recent years. When it comes to broadband infrastructure, the region fares well overall however substantial gaps in household coverage are evident between urban and rural areas.

Finally, the success of innovative rural mobility solutions will be influenced by governance-related factors including coordination within and between different levels and branches of government, cooperation between government and other types of stakeholders and the availability and stability of funding. The involvement of local residents was found to be particularly crucial to the success of new mobility offers. Local governments play an important role in facilitating this involvement and can also provide support to initiatives initiated and run by community members.

Individual, context specific and governance related factors affect different mobility solutions in different ways. This report provided a detailed account of the influence of sociocultural factors as they relate to six different innovative mobility solutions: Demand responsive transport; car sharing; ride sharing; mobility as a service (MaaS); combined transport solutions; and service to people. A summary of the findings can be found in Table 2. Ultimately, no one mobility solution will provide all the answers for all rural communities. By working with the local community and weighing the pros and cons of each approach however, it is possible to find a solution that will work well in a specific socio-cultural context.

Table 2. Summary of relevant target groups for different mobility solutions based on sociocultural factor analysis

Solution	Relevant sociocultural considerations			
	Individual-related factors	*Context-specific factors*	*Governance-related factors*	*Potential target groups*
Demand responsive transport (DRT)	- has a social component - usually includes some form of assistance if required - works well in areas with ageing populations	- ideal for isolated communities with dispersed populations - real-time information on services useful for some passengers - online and offline booking options should be provided - taxis may work better in small, dispersed populations and minibuses in larger places with more concentrated populations	- requires subsidies - relies on volunteer drivers - well-suited to a community-oriented partnership model - works best when coordinated with other services (e.g. healthcare) - requires concerted marketing and branding efforts	- people over 65 years of age (particularly women)
Car sharing	- offers users a high level of flexibility and autonomy - opportunity to reduce environmental impact without sacrificing independence - no expectation of social contact with others	- relies on a central parking place easily accessible to users - generally relies on an online booking system - works better when trust is established between users (e.g. tight-knit communities, members of same target group)	- works best with peer-to-peer promotion (e.g. "local champions", engaged steering group) - Local government an important stakeholder (even potential to include own fleet in the pool) - requires measures to keep the fleet in a good condition - higher fixed cost (i.e. membership fee) and lower rental fee may increase usage	- occasional car users looking for a cheaper and/or more environmentally friendly alternative to car ownership - two car households looking for a more cost-effective and/or environmentally friendly alternative to a second car

Ride sharing	- has a strong social component - provides limited flexibility and autonomy - high cost-saving potential - requires a change of habit and thus must offer clear benefits to users (e.g. be more convenient or cheaper than other options)	- requires a high level of trust between strangers - generally relies on an online platform of some kind (a well-known platform like Facebook may be more familiar to users and saves on set-up cost) - relies on people going in the same direction at the same time - works best in villages located within commuting distance of a larger centre (i.e. with many people traveling in the same direction at similar times)	- legal aspects can be challenging (e.g. security measures, drivers licence checks) - works best as a bottom-up initiative - requires marketing, promotion and buy-in from local community as a starting point for behaviour change - Requires a dedicated individual / group to get things started and keep them going - attracting drivers can be a challenge - incorporating taxi companies in the solution can be useful in avoiding conflict	- people with strong environmental motivation and / or less fixed transport habits (e.g. urbanites who have recently moved to a rural area, young people) - work commuters - people with spare time seeking social contact (e.g. retirees) - low-income groups - people participating in hobbies / classes together (e.g. after-school activities for young people)
Mobility as a Service (MaaS)	- high level of convenience and flexibility - potential for cost savings compared to private-car ownership - time savings - incorporates door-to-door options	- relies on the presence of a variety of transport options - relies on an online platform	- may require public subsidies due to lack of commercial viability in rural areas - may need to bring on board less traditional "public" transport services to make viable in rural areas (e.g. school buses, DRT) - can be expensive to develop a well-functioning MaaS platform	- people without cars - two car households looking for a more cost-effective and/or environmentally friendly alternative to a second car -young people

			(collaboration between municipalities could reduce cost) - requires strong collaboration between government, businesses and citizens to be adapted to the rural context	
Combined transport solutions	- low level of flexibility and autonomy - potential for cost savings - may offer potential for supported travel (dependant on the solution)	- may rely on centralised pick up points (not ideal for highly dispersed populations) - may rely on online platforms	- cannot work without strong collaboration in policy (between different policy areas) and in practice (between different service providers and between public and private actors) - requires good knowledge of the transport needs of the target group - should be branded in a way that provides credibility (e.g. municipal initiative) - may involve legal hurdles (e.g. utilising school bus routes for other travellers) - requires an open mind and outside-the-box thinking - can be challenging to raise public awareness and inspire confidence in new initiatives	- low income earners - people without cars

Service to people	- eliminates the need for mobility	- relies on dedicated individuals and strong ties between community members - works well in remote and isolated communities where a particular service of general interest is not available.	- solutions tend to emerge through a bottom-up approach - requires a high level of collaboration between stakeholders	- people with limited mobility - remote and isolated communities

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